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"To promote the study and dissemination of knowledge of the cause, prevention and control of diseases of the teeth, their supporting structures and adnexa and related subjects; and to foster and promote a better scientific understanding between the fields of dentistry and medicine."

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JOURNAL OF DENTAL MEDICINE

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DR. ALEXANDER SOBERMAN NEW JOURNAL EDITOR

Dr. Alexander Soberman

With this issue of the Journal of Dental Medicine, the new editor, Dr. Alexander Soberman formally assumes the mantle which was so ably worn by Dr. Irving Yudkoff for the past eight years.

Dr. Soberman, who has been a member of the Academy since 1949, brings with him a much varied background and a wealth of experience. In addition to a well-founded knowledge of teaching and research, he is intimately acquainted with the technical aspects of journalism and has served as assistant editor of this Journal for the past six years.

He is an Assistant Professor of Periodontia and Oral Medicine at New York University College of Dentistry and is Associate Attending for Oral Diagnosis at Beth Israel Hospital, New York. In addition to numerous other professional affiliations, the editor is also an Associate Fellow of the Academy of Psychosomatic Medicine and a member of the American Academy of Periodontology.

The Academy congratulates Dr. Soberman and extends to him its best wishes for a successful tenure as Editor.

* * *

A MESSAGE FROM THE EDITOR

It is with a certain amount of apprehension and diffidence that your editor takes over the editorial reins from his predecessor. Were it not for Dr. Yudkoff's excellent preparation and assistance, it is extremely doubtful that this issue would have been ready on time. The myriads of details involved could not possibly have been handled without his complete cooperation.

It will be a formidable task indeed, to maintain the high journalistic standards and the enviable reputation which the Journal enjoys.

The responsibility is unquestionably a great one and the editor pledges to do all that he can to justify the confidence that the Academy has placed in him. Your suggestions and criticisms will always be welcomed.

Alexander Soberman, D.D.S.

THE SEALING OF PULPLESS TEETH EVALUATED WITH RADIOISOTOPES†

F. JAMES MARSHALL, D.M.D., M.S.* and MAURY MASSLER, D.D.S., M.S.**

INTRODUCTION

Endodontists generally agree that the root canals in pulpless teeth should be permanently and completely obturated. However, the numerous materials and methods used to fill root canals have seldom been tested experimentally. Documented evidence should replace the clinical impressions and the indirect clinical evidence presently used as a basis for selection of endodontic procedures.

The following pertinent questions should be answered: (1) How effective are the fillings used to seal the root canal? Do they really seal against the ingress of small particles and ions as well as against large particles and bacteria? (2) What is the role of the occlusal seal? If this seal is broken (as frequently happens clinically), is the seal of the root canal also altered? And vice versa, if the root canal seal is poor, will a good occlusal seal help to resist periapical fluid invasion into the root canal? (3) Many different types of root canal obturators and filling techniques are available and new ones are offered each year as being "superior". These offers are made empirically and usually without documentation. Are the differences among the different methods of root canal obturation large and significant or are they small and relatively unimportant?

The different methods of sealing root canals range from packing small pieces of gutta percha into the canal under pressure to the use of sealers (usually adhesive zinc oxide-eugenol cements or chloroform solutions of gutta percha) combined with gutta percha or silver points. Each school seems to have a "different and better" technique. To our knowledge, few attempts have been made to evaluate the effectiveness of the various methods of sealing the root canal, on a comparative or quantitative basis. A few attempts have been made to present some method of testing the seal of a root canal filling with dye, bacteria and recently with isotopes. These have been, in effect, preliminary trials. Extensive testing as has been done on coronal filling materials has not, to our knowledge, been attempted.

The radioisotopes offer a delicate and accurate tool for testing the ability of different fillings to seal the canals. This study was designed to use this tool to compare the sealing quality of a number of root canal fillings.

REVIEW OF LITERATURE

Although there is a rich literature dealing with marginal leakage of fillings in the crowns of teeth, little could be found that dealt with this property of root canal fillings. Price[1], Fraser[2] and Seltzer[3] used bacteria to test the marginal integrity of coronal dental fillings. Fiasconaro and Sherman[4] used air under pressure. Fischer[5], Buchanan[6] Hirsch and Weinreb[7] used dyes, and Armstrong and Simon[8], Sausen, Armstrong and Simon[9], Crawford and Larson[10] and Going[11] used radioisotopes.

Grossman[12] pioneered constructively when he studied the hermetic seal of temporary occlusal fillings used in endodontics. He placed samples of "temporary stopping", baseplate gutta percha, zinc phosphate cement, "Pro-Tem" and zinc oxide-eugenol in glass tubes (roughened on the inside) and immersed these tubes in dyes (gential violet, carbolfuchsin, and sudan III). He found that zinc oxide-eugenol sealed best under the conditions of his test. It is interesting to note that zinc oxide-eugenol is the basic material used in all but one of the sealers used in this study. Massler and Ostrovsky[13] studied a series of filling materials in a

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manner similar to that used by Grossman. They also found zinc oxide-eugenol paste to be the most effective sealer under the condition of their tests. McElroy[14] studied "volume change" (contraction) and "porosity" (fluid absorption) of a number of root canal filling materials, by placing each in brass tubes at 37°C. in moist chambers for 7 days. The specimens were then examined for crevices between the material and the brass ring wall. Wach's paste, neo-balsam and Rickert's sealer showed the smallest crevices and the least amount of volume change. McElroy[14] also measured the weight of blood serum absorbed by these materials after immersion for one week. Wach's paste showed the least weight gain, with neo-balsam next. Gutta percha absorbed three times as much blood serum as Wach's paste, while chloropercha absorved twelve times that weight.

Dyes and isotopes were used to test the marginal integrity of root canal fillings by Dow and Ingle[15] and Schroeder.[16] Dow and Ingle[15] tested the effectiveness of cementing media of root canal fillings using radioiodine (I^{131}). Several anterior teeth were studied. Half were filled carefully with gutta percha and a sealer using lateral condensation to achieve complete obturation of the canal while the other teeth were filled without a great effort to seal the canals. The specimens were coated with sticky wax leaving only the apex bare and then immersed for 120 hours in radioiodine (1.6 μc/cc.). Autographs of the sectioned teeth showed root canal penetration of the isotope in only a poorly obturated specimen.

Schroeder[16] used 210 formalin-fixed teeth and 90 freshly extracted teeth to study the permeability of various root canal filling materials to methylene blue dye. Some of the specimens were centrifuged with a reservoir of dye sealed over the crown. He reported that silver amalgam showed no leakage with or without centrifuging while zinc phosphate leaked with and without centrifuging. A gutta percha point sealed with zinc phosphate cement showed no leakage with or without centrifuging if the gutta percha point was fitted tightly, otherwise it showed leakage. Diaket showed no leakage before centrifuging but leaked with centrifuging. Gutta percha points sealed with chloropercha leaked with and without centrifuging.

Stewart[17] studied the "tensile strength" (adhesiveness) and permeability of Diaket, Grossman's sealer and Kerr's sealer. Wires were sealed in special metal tubes using these sealers. After setting for one week, the force necessary to withdraw the wires was measured with the aid of a Scott Tester. Diaket showed the greatest "tensile strength".

Stewart[17] also studied the permeability of these root canal filling materials by immersing them in methylene blue dye at 37°C. up to 6 months. After 6 months, Kerr's and Grossman's sealers, used alone, showed surface penetration to a depth of 0.5 mm. while Diaket showed no

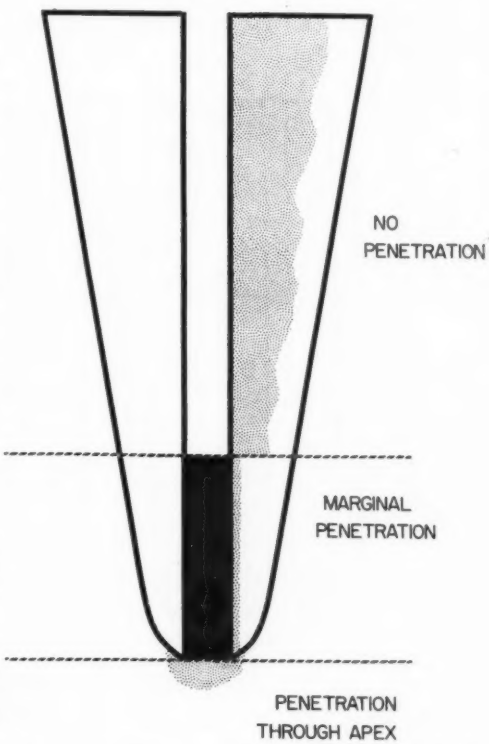

Fig. 1. Schematic drawing showing the method of assessing the extent of penetration by isotope along the margin of root canal filling. Stippling indicates the position of the tracer as seen in the autogram.

penetration at all. When the teeth were sectioned at the apical one-third and mid-root levels, these root canal fillings showed no permeability.

While studying the pathways of exchange of minerals in teeth with the aid of radioactive phosphorus, Wasserman, Blayney, et al,[18] observed the sealing properties of multiple gutta percha cones plus Callahan's resin liner when these were used as root canal fillings in the maxillary anterior teeth of dogs. When radioactive phosphate (P^{32}) was injected intravenously into the dog, these fillings sealed the treated teeth against the penetration of the isotope into the root canal, as shown by radioautograms of the sectioned teeth. This was in contrast to teeth with vital pulps which showed penetration of P^{32} into the pulp canal tissues and root dentin.

Thus, although a few attempts have been made to test the marginal seal of root canal fillings, only in two instances have isotopes been used for this purpose and in both of these, very few teeth and filling materials were examined. This investigation was therefore designd to study the marginal seal of most of the root canal fillings in current use by means of isotopes (figure 1). A number of isotopes were used, rather than only one, since Going[11] demonstrated that marginal pentration in coronal fillings was partly a function of ionic charge and chemical reactivity as well as the particle size of the tracer.

MATERIALS AND METHODS

A total of 261 freshly extracted human, single rooted teeth were used for this investigation. The teeth were collected and stored in

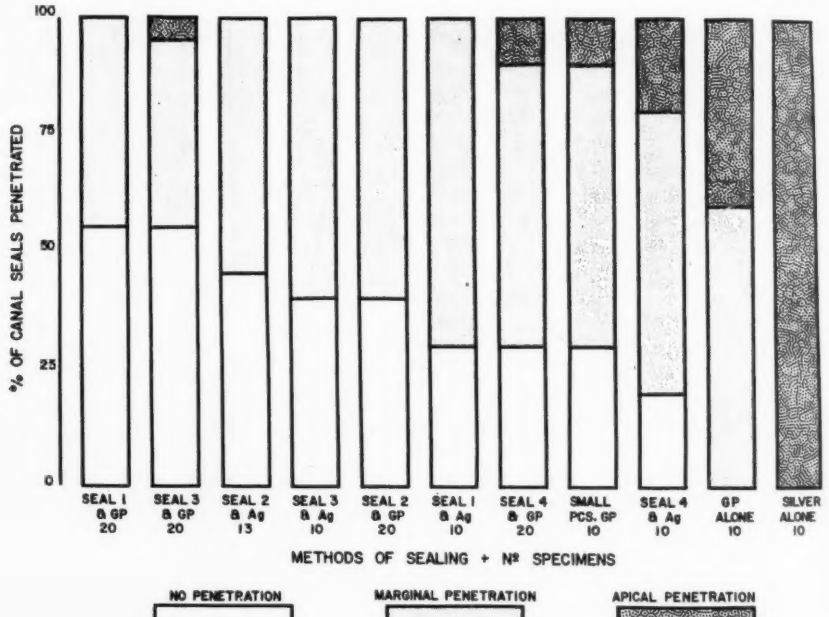

Fig. 2. Bar graph showing differences in sealing by various root canal fillings against marginal penetration by S^{35}. Gutta percha (GP) with Sealer 1 showed the least penetration (55%, no leakage; 45% slight leakage). Silver points used without sealer permitted complete penetration (stippled) through the apex in every specimen (100%). Gutta percha points (GP) plus sealer sealed better than silver points (AG) with the same sealer.

TABLE 1.—ROOT CANAL SEALERS USED IN THIS STUDY

	Sealer #1		
Kerr Sealer (Rickert's Formula)[19]	Liquid —	Oil of clove	78%
		Canada balsam	22%
	Powder —	Zinc oxide	441.2%
		Precipitated silver	30.0%
		White resin	16.0%
		Thymol iodide	12.8%
	Sealer #2		
Wach's Paste[14]	Liquid —	Canada balsam	20 cc.
		Clove oil	6 cc.
		Eucalyptol	0.5 cc.
		Beechwood creosote	0.5 cc.
	Powder —	Zinc oxide	10. gm.
		Calcium phosphate	2 gm.
		Bismuth subnitrate	3.5 gm.
		Bismuth subiodide	0.3 gm.
		Heavy magnesium oxide	0.5 gm.
	Sealer #3		
Klora Perko N-O (Formula by Nygaard-Ostby, Manufactured by Union Broach Co.)[20]	Liquid —	Chloroform	
	Powder —	Resina colophonia	
		Canada balsam	
		Gutta percha	
		Zinc oxide	
	Sealer #4		
Grossman's Sealer[21] (revised)	Liquid —	Eugenol	
	Powder —	Zinc oxide	40%
		Stabillite resin	30%
		Bismuth subnitrate	15%
		Barium sulfate	15%

normal saline at 44°F. (7°C.) and the majority were used within three days after extraction. To facilitate the mechanical treatment of the root canals, the crowns were removed by a band saw. The canals were enlarged using typical clinical procedures, i.e., Kerr reamers and files used alternately, progressing from size 1 to size 6. Tap water was used for lubrication and flushing. Enlargement was considered to be complete when a size 6 Kerr file passed through the apical foramen freely.

ROOT CANAL FILLINGS USED

The canals were filled with a variety of techniques using two different root canal points (gutta percha and silver) and four sealers (Table 1). Gutta percha was also packed into the canal in small pieces. This produced 11 different root canal fillings (figure 2).

A. *Gutta Percha Point Filling Combinations:*

1. Gutta percha points of a size comparable to the #6 Kerr file, were trial fitted in the

root canal. When the best fitting point had been selected, one of the sealers was mixed according to the manufacturer's instructions or to instructions recommended by the originator of the sealer. The root canal was dried with air and paper points and filled with the sealer. The gutta percha point was then coated with sealer and forced into the root canal with firm pressure by means of root canal pluggers. The gutta percha point with sealer was used to fill only the apical third of the canal, all the filling material above this apical third being removed with a warm plugger (see figure 1). Any material forced outside the apical foramen was also removed. This procedure was followed using all four sealers (figure 2).

2. A gutta percha point, selected as above by trial fitting into the canal, was seated firmly into the root canal without any sealer. Root canal pluggers were not used. The excess protruding beyond the apical foramen was severed with a sharp knife. This was referred to as gutta percha (GP) used alone (no sealer).

3. Pieces of gutta percha, 0.5 to 1.0 mm. long were packed individually in the canal and condensed to form a homogenous mass with the aid of warmed root canal pluggers. This root canal filling was placed in only the apical third of the root canal.

B. *Silver Point Filling Combinations:*

A silver point comparable in size to the #6 Kerr file was fitted and sealed into the canal using each one of the 4 sealers in the same manner as for the gutta percha points.

As a control, silver points were fitted and placed into the canal firmly without a sealer.

RADIOISOTOPE TRACERS USED

Six radioisotopes (S^{35}, I^{131}, Rb^{86}, Na^{22}, P^{32} and Ca^{45}) were used to test the marginal sealing of these fillings in two ways: (1) from inside the tooth with the tracer solution placed by hypodermic syringe in the unfilled portion of the root canal above the root canal filling (figure 1), and (2) from outside the tooth, with the root of the tooth immersed in the tracer solution. In all cases, the teeth were exposed to the tracer solutions immediately after filling. This did not allow time for the sealer to set.

The characteristics and radioactivities of the radioisotope used are listed in table 2.

Method 1. Penetration from inside the canal.

The tracer solutions were adjusted to contain 150 μc/cc. Approximately 0.02 cc. of this solution was introduced into the unfilled portion of the root canal by means of a hypodermic syringe. The teeth were then stored in a closed chamber at 37°C. and 100% humidity, for 24 hours.

After 24 hours, all teeth were sectioned longitudinally according to the technique described by Going[11] to give two hemi-sections. The flat surfaces were then sanded lightly to remove impacted contaminants caused by the cutting, thoroughly washed and dried.

Method 2. Penetration from outside the canal.

The tracer solutions were adjusted to contain

TABLE 2.—RADIOISOTOPES USED IN THIS STUDY

Symbol	*Compound*	*Half-life*	*Radiation*	*Ionic charge*	*Mev.**
I^{131}	Na I (Isotonic)	8 days	Beta (—) Gamma	—	0.605
Rb^{86}	$Rb^{86}Cl_2$	19 days	Beta (—) Gamma	+ +	1.56
Na^{22}	$Na^{22}Cl$	2.6 years	Beta (+) Gamma	+	0.58
S^{35}	$Na_2S^{35}O_4$	87 days	Beta (—)	— —	0.167
Ca^{45}	$Ca^{45}Cl_2$	163 days	Beta (—)	+ +	0.254
P^{32}	$Na_3P^{32}O_4$	14 days	Beta (—)	— — —	1.71

* Million electron volts (Mev).

10-20 μc/cc. of radioactivity. The apical third of each tooth was imersed in approximately 1.0 cc. of solution. Surface absorption by the cementum and enamel was prevented by coating these surfaces with sticky wax, leaving only the apical 2 to 3 mm. of the root bare. After the teeth were immersed in the isotope solutions, they were stored in capped plastic tubes at 37°C. and 100% humidity for 24 hours.

This group was divided into two subgroups according to the type of occlusal seal used. In the first subgroup, the occlusal canal opening was not sealed and was covered only with a cotton pellet. In the second subgroup, the occlusal opening was sealed with zinc oxide-eugenol cement.

METHOD OF RADIOAUTOGRAPHY

Autograms were prepared from the hemi-sections using Minimax extra-fast double emulsion dental x-ray film. The flat side of the hemi-section was placed in tight contact with the film by means of a plastic clamp as described by Going[11]. Exposure time was determined empirically for each isotope to give the greatest amount of definition. The "average" exposure time for these survey autograms was 24 hours. At least one under-exposed and one over-exposed autogram were also produced to locate the isotope penetration more exactly.

Short exposure radiograms were also taken of each hemi-section to outline the tooth and the root canal filling. The radiograms were superimposed on the autograms and a composite picture printed.

METHODS OF ANALYSIS

Figure 1 shows the method used to describe the degree of penetration from inside the canal. If the autograms showed no penetration into the margins of the root canal filling, it was recorded as "No Penetration" (figure 3A) "Marginal Penetration" was considered to be present when even the smallest amount of pene-

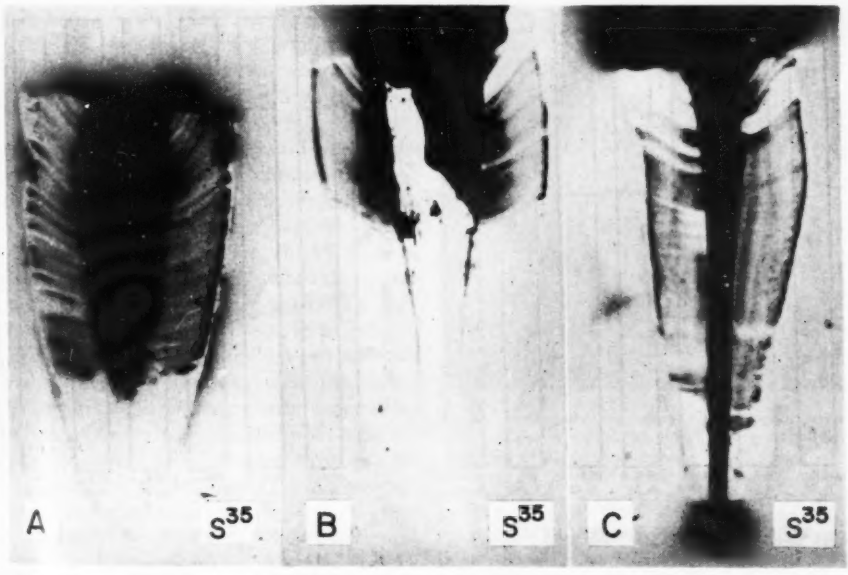

Fig. 3. Autograms showing three types of penetration by S^{35} into various root canal fillings. *A*, gutta percha point plus sealer, showing no penetration. *B*, gutta percha without sealer, showing minor marginal penetration. *C*, silver point without sealer showing complete penetration through the apex. Note penetration of S^{35} along the dentinal tubules to the dentino-cemental junction and its concentration near the junction. Note areas of reduced permeability at cervical and apical levels in C.

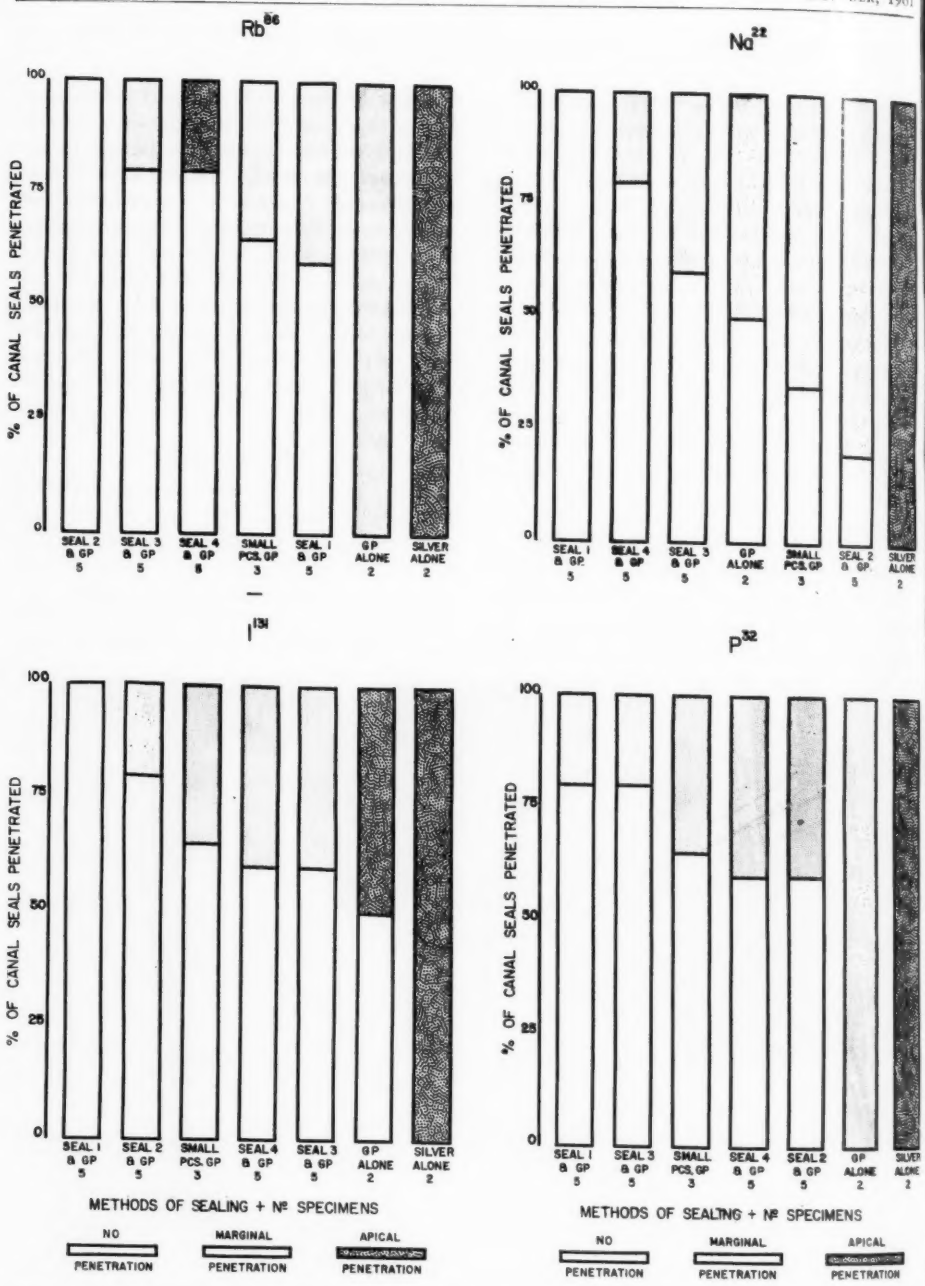

Fig. 4. Graphs showing the effectiveness of sealing by various root canal fillings against marginal penetration by Rb^{86}, Na^{22}, I^{131} and P^{32}. All specimens filled with a fitted silver point without sealer showed complete penetration of each isotope through the apex (stippled bar). Gutta percha alone was also inadequate. Note the relatively small differences in sealing efficiency of the fillings when any of the four sealers was used with a gutta percha point.

tration occurred between the root canal filling and the dentin wall (figure 3B). Penetration of the isotope beyond the root canal filling and through the root apex was recorded as "Complete Penetration" (figure 3C).

The same scheme was used to describe the penetration of the isotope from outside the canal.

FINDINGS

MARGINAL PENETRATION FROM INSIDE THE CANAL

Although five radioisotopes (S^{35}, Rb^{86}, Na^{22}, I^{131} and P^{32}) were used in this series to trace the marginal integrity of each type of root canal filling, the majority of the specimens were tested using S^{35} because it produced the autogram with the sharpeset detail. S^{35} also showed the best ability to penetrate along the margins of these root canal fillings.

S^{35} Penetration: Figure 2 shows that S^{35} penetrated through the margins of some specimens in each group of root canal fillings and that it failed to penetrate relatively few specimens. Penetration through the apex occurred in all of the 10 specimens filled with a silver point without sealer. Fitted gutta percha points without sealer were only slightly more effective than the silver point without sealer, showing complete penetration in 50%, and marginal penetration in 50% of the specimens. In contrast to this, the best root canal filling, a single gutta percha point with Sealer 1 (20 specimens) showed perfect sealing in 55% and 45% with only slight marginal penetration.

The other root canal fillings performed between these two extremes. Gutta percha points with Sealers 1, 2, 3 or 4, permitted less isotope penetration than silver points with the same Sealers (figure 2). There were only minor differences in efficiency between Sealers 1, 2 or 3. Gutta percha points without sealer, silver points with sealer 4 and small pieces of gutta percha permitted penetration of the isotope to the apex in some specimens (stippled area in figure 2). However, a few specimens also showed perfect sealing (clear area in figure 2).

The use of a sealer greatly improved the efficiency of gutta percha points and silver points as root canal fillings. Gutta percha points alone sealed much better than silver points alone, possibly because of the malleability of the gutta percha. Small pieces of gutta percha were

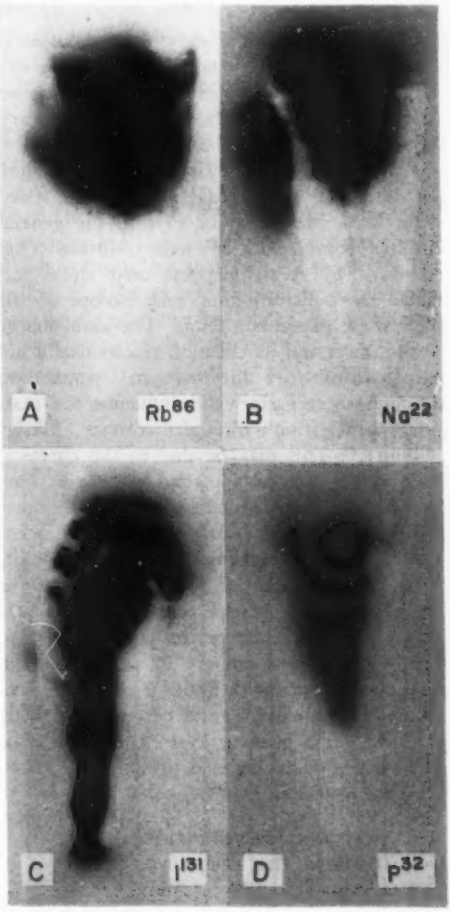

Fig. 5. Autograms showing typical penetration patterns produced by various radioisotopes. Note poor definition of all four autograms when compared to S^{35} in figure 3. *A*, root canal filled with gutta percha point and Sealer 1 showing "no marginal penetration" by Rb^{86}. *B*, canal filled with small pieces of gutta percha without sealer showing slight marginal penetration by Na^{22}. *C*, canal filled with a silver point without sealer showing penetration of I^{131} along the root canal and through the apical foramen. *D*, canal filled with a gutta percha point and Sealer 3 showing no marginal penetration to P^{32}. Note contrast and halation that mask detail of dentinal penetration by this isotope.

slightly more efficient than a silver point with Sealer 4 or a single gutta percha point without sealer, but did not seal as well as had been previously reported.

Figures 3A, B and C show the type of autogram produced by S^{35} and illustrate the various degrees of marginal penetration by the isotope. Attention is called to the clarity of detail and tubular pattern in these autograms.

Penetration by Other Isotopes: When a similar series of root canal fillings were tested using Rb^{86}, Na^{22}, I^{131} or P^{32}, all the general findings derived with S^{35} were confirmed (figure 4). (1) A silver point used alone permitted the penetration of each isotope to the apex in each specimen tested. The ionic charge on the tracer and its chemical reactivity did not seem to influence the marginal penetration although these factors did influence the marginal penetration through coronal fillings (Going).[11] This may be due to the chemical inactivity of the gutta percha and the sealers. (2) A gutta percha point alone was a somewhat more effective filling than a silver point alone but not yet adequate. A filling of small pieces of gutta percha sealed better than a single fitted gutta percha point without sealer. (3) A filling of gutta percha point and Sealer 1 showed the least amount of penetration. A gutta percha point with Sealer 2 or 3 were less efficient and equal. A gutta percha point with sealer 4 was, in general, least efficient. A gutta percha point with any one of the sealers was much more efficient than no sealer.

MARGINAL PENETRATION FROM OUTSIDE THE APICAL FORAMEN

Three radioisotopes (S^{35}, I^{131} or Ca^{45}) were used to test the marginal integrity of two of the root canal fillings described in the previous section, by immersion of the root tip in the tracer solution. This tested the marginal integrity of the seal against penetration by the isotope from outside the canal via the apex. In addition, the influence of the occlusal seal on marginal penetration was tested by plugging the entrance to the canal in two ways, with cotton (which actually left the canal open) or zinc oxide-eugenol. The latter was reported to provide the best occlusal seal by Grossman in 1939 and Massler and Ostrovsky in 1954.

Apical Penetration by S^{35}. This method of testing with S^{35} yielded results similar to those obtained by placing the isotope solution inside the canal (compare figure 6 with figure 2 and fiigure 7A with figure 3C). A gutta percha point with sealer 2 sealed approximately 25 to 50% of the specimens perfectly, while 50 to 75% showed slight marginal penetration. A gutta percha point without sealer showed complete penetration in 75% of the specimens, the rest showed deep marginal penetration. There were no differences apparent whether the occlusal opening was plugged with cotton or with zinc oxide-eugenol.

Apical penetration by I^{131}. All of the four specimens filled with a gutta percha point and Sealer 2 showed a complete lack of penetration and the four teeth filled with a gutta percha point without sealer all showed complete penetration by the isotope. These results are quite similar to the previous series in which the I^{131} was placed inside the canal (compare figures 4 and 6).

Apical penetration by Ca^{45}. This isotope penetrated the margins of the root canal fillings much less than the others but showed essentially the same results. The canal sealers greatly improved the marginal seal and there was no great improvement when an occlusal seal of zinc oxide-eugenol was added.

Effect of Occlusal seal: A good occlusal seal with zinc oxide-eugenol did not appear to improve the marginal seals of the root canal fillings, whether or not a canal sealer was used. This was quite different from the results obtained by Marshall[22] using gentian violet. In a previous series, it was found that sealing the occlusal opening with a zinc oxide-eugenol cement greatly reduced the marginal penetration of root canal fillings by gentian violet, particularly when no root canal sealer was used.

COMPARISON OF AUTOGRAMS PRODUCED BY DIFFERENT ISOTOPES

S^{35}. A comparison of autograms produced by the different radioisotopes leaves little doubt that S^{35} is superior to the other five isotopes

used. None of the other isotopes showed the tubular pattern of the dentin quite as clearly (figures 3, A, B, and C and figure 7A). None of the others revealed the fine histologic details such as "dead tracts" and Tome's granular layer as did the S^{35}. When the filling margin was penetrated by S^{35}, the extent of the penetration can be seen much more clearly than with the other isotopes. S^{35} also has convenient half-life of 87 days.

Rb^{86}. penetrated into the dentin fairly well to the dentino-cemental junction, but the contrast was poor and a poorly differentiated autograph resulted (figure 5A).

Na^{22} produced an autograph with good contrast but did not penetrate the dentin as well and produced excessive halation, with the result that details were badly obscured (figure 5B).

I^{131} also produced an autograph of high contrast similar to Na^{22}, but penetrated into the dentin even less than Na^{22} and much less than Rb^{86} (figures 5C and 7C). Halation with masking of detail resulted with I^{131} as with Na^{22} (figure 5C).

P^{32} produced the poorest autographs, with extreme halation and poor penetration (figure 5D). Details were lost completely unless supplemental radiographs were used.

Ca^{45} produced sharp autographs (figure 7B) similar to S^{35} (figure 7A). Ca^{45} was abandoned as a tracer because it penetrated into the dentin and into the filling margins less than S^{35}. The failure of calcium and phosphate to penetrate into the tubules may be related to the calcium phosphate content of the dentin.

Comments: A review of table 2 shows that

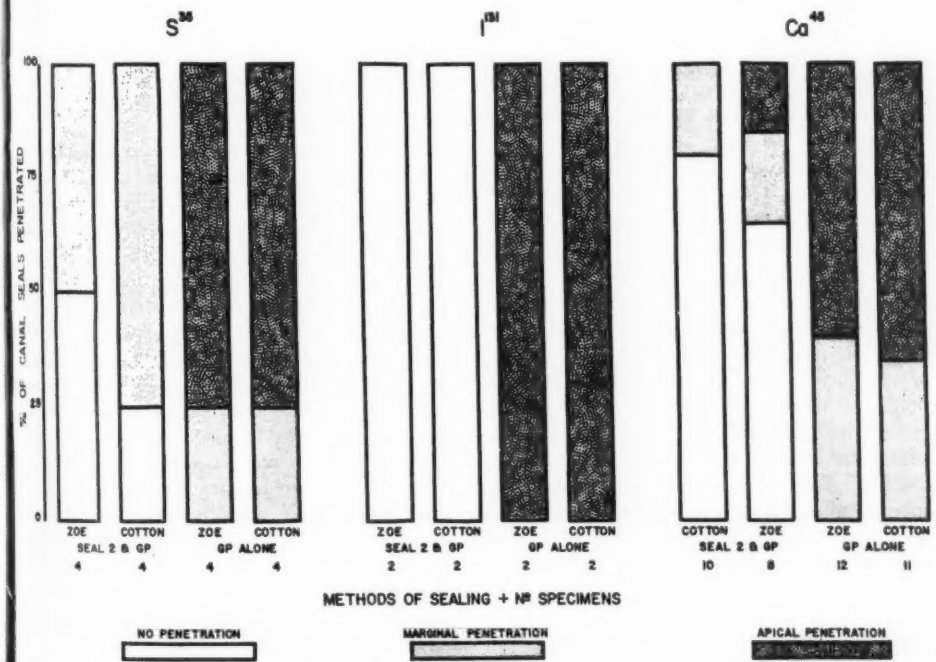

Fig. 6. Bar graphs showing the relative effectiveness of fitted gutta percha points with and without sealer against marginal peneration by S^{35}, I^{131} and Ca^{45}, via the apex when the teeth were immersed in the tracer solutions. Specimens filled with a fitted gutta percha point without sealer were penetrated by each isotope to the pulp chamber while specimens filled with a fitted gutta percha point and sealer 2 showed much less marginal penetration. "Apical penetration" signifies penetration of the isotope through the entire marginal length of the filling into the pulp chamber. Note that the penetration is not significantly affected by the occlusal seal.

Fig. 7. Autograms showing typical penetration patterns produced by various radioisotopes when the teeth were immersed in the tracer solutions. *A*, canal filled with a gutta percha point alone without sealer. The occlusal opening was filled only with cotton. Note the complete penetration into the pulp chamber by S^{35}. Note also the impermeable apical dentin, the layer of cementum and the dentinal tubule pattern similar to that seen in figure 3. *B*, canal filled with a gutta percha point without sealer and with the occlusal opening filled with cotton. Note complete penetration into the pulp chamber by Ca^{45}. Note similar pattern of penetration when compared with S^{35}. *C*, canal filled with a gutta percha point without sealer and an occlusal seal of zinc oxide-eugenol. This specimen was immersed in I^{131}. Note penetration into the pulp chamber. Note reduced contrast and dentinal detail compared to A and B.

the sharpness of detail obtained with a given isotope is related inversely to its energy, which is expressed in million electron volts (Mev). Going[11] showed in his review that a low energy emission produces a short track and that only those on the surface of the specimen strike the silver grains in the emulsion resulting in a sharply detailed autograph. Conversely, high energy emitters such as P^{32} activate many more of the silver grains in the emulsion and this results in halation.[23] Fusayama, et al[24] showed that the half-thickness (thickness that halves intensity) of dentin to P^{32} is 0.38 mm. It can be seen that sharp autograms are produced by low energy emitters or only by thin sections (under 0.38 mm. for P^{32}) containing high energy emitters. Thin sections were not practical for this study.

DISCUSSION

The effectiveness of a root canal filling can finally be evaluated only *in vivo*, in a proper biologic system.[21, 25] This investigation was designed to test the sealing properties of root canal fillings, *in vitro*. It is obvious that translation of the results obtained in this study to the clinical situation must be made with caution. Although some factors found *in vivo* such as warmth and humidity were included in these tests, other factors such as the influence of vital tissue and osmotic pressure were not.

Since the isotope was placed in the canal or around the apical foramen immediately after the canal was filled, changes in the sealer which occur after setting, such as shrinkage or cracking, were not tested. These factors could completely reverse the findings. McElroy[14] found that changes occurred in the volume of some filling materials after seven days. Perhaps greater leakage would have occurred if the root canal filling had been tested with isotopes seven days after filling. Our observations were limited to the 24 hour period immediately after the filling was inserted. Nonetheless, a number of clinically valid inferences can be drawn from these tests.

Going[11] found that all coronal restorations permitted some marginal penetration by radioisotopes. Our study shows that it is possible to seal root canals completely by a proper filling.

The most efficient root canal filling tested

consists of a fitted gutta percha point and sealer. A silver point without a sealer is the least efficient. A gutta percha point without sealer is only partially effective. Gutta percha in small pieces without sealer, is slightly better. It seems valid to conclude that sealers are essential for effective root canal obturation with the technics employed in this investigation.

The sealers tested differed only slightly in efficiency. These differences are probably of little clinical significance. Each was more efficient when used with a fitted gutta percha point than with a fitted silver point.

It is interesting to speculate as to why the gutta percha point sealed the canal better than the silver point. It is possible that the flexible and malleable gutta percha adapted itself more completely to the irregularities of the canal walls. It is also possible that the use of more than one gutta percha point in the canal (multiple cone technique) would further increase the sealing efficiency of a root canal filling. The addition of gutta percha points after an initial silver point and sealer filling has also been recommended.

The seal of root canal fillings may also be modified by the occlusal seal. In a previous series of tests, it was found that gentian violet penetrated less when the occlusal opening was sealed with zinc oxide-eugenol than when it was simply plugged with cotton. This could explain the absence of clinical symptoms in teeth which radiographically show poor root canal fillings. However, the isotopes are much smaller and diffuse much more rapidly than the dye molecules and in this study it was found that the isotope tracers penetrated equally well whether or not an occlusal seal was used. It is apparent that a good root canal filling cannot be improved by a good occlusal seal. However, good occlusal seal is essential during treatment prior to filling, when the apex is open, since otherwise the canal may become filled with periapical exudate.

The skill of the operator is perhaps more important to successful obturation than the materials used. During one phase of the study, a series of teeth were treated and filled by a dental student. The results were remarkable for their extreme variability. Thereafter, only one operator was used, in order to eliminate this variable.

Pre-clinical testing of root canal techniques and materials should be carried out before they are presented for clinical trial. The usefulness of radioisotope tracers in testing the efficiency of root canal filling seals is demonstrated by this study.

CONCLUSION

Root canals filled with a single well fitted gutta percha point or a silver point without sealer, were not adequately sealed against penetration by ions from within the tooth. Only minor differences were found in the sealing efficiency of the various sealers used. A gutta percha point without sealer, produced a superior filling to a silver point. A root canal could be completely sealed 100% of the time against the marginal ingress of even a small radioactive ion by the proper use of a well fitted gutta percha point and a proper sealer. S^{35} was the best tracer of the series used to study the sealing of root canals, because of the excellent detail and deep penetration which it showed in the autogram. Figures 5, A, B, C and D, depict the types of autograms produced by the various isotopes. Compare with figures 3, A, B and C.

ACKNOWLEDGEMENTS

Sincere thanks are due to Dr. Noel D. Martin, Visiting Professor from Sydney, Australia. Dr. E. Kaplan, Associate Director of the Radioisotope Service and Dr. Harold L. Dute, Chief of Dental Service of the Veterans Administration Hospital at Hines, Illinois, for their splendid cooperation and genuine helpfulness.

BIBLIOGRAPHY

1. Price, W. A.: Report of Laboratory Investigations on the Physical Properties of Root Filling Materials. J.A.D.A. 5:1260, Dec. 1918.
2. Fraser, C.: A Study of the Efficiency of Dental Fillings. J. Dent. Res. 9:507, Aug. 1929.
3. Seltzer, S.: The Penetration of Microorganisms Between the Tooth and Direct Resin Fillings. J.A.D.A. 57:560, Nov. 1955.
4. Fiasconaro, J. and Sherman, H.: Sealing Properties of Acrylics. N. Y. State Dent. J. 18:189, May 1952.
5. Fischer, M.: Experimentelle Untersuchungen uber die Abschlussdichtigkeit der in der Zahnheilkunde Gerbrauchlichen Fullingsmaterialien. Schweiz. Nonotschr. f. Zahnheilk. 59:595, Aug. 1949.
6. Buchanan, G. A.: Resistance of Self Curing Acrylic Resin to the Passage of Dye Between the Filling and Cavity Wall. J. Canad. Dent. A. 17:131, Mar. 1951.

7. Hirsch, L. and Weinreb, M. M.: Marginal Fit of Direct Acrylic Restorations. J.A.D.A. 56:13, Jan. 1958.
8. Armstrong, W. D. and Simon, W. J.: Penetration of Radio-calcium at the Margins of Filling Materials: A Preliminary Report. J A.D.A. 43:684, Dec. 1951.
9. Sausen, R. E., Armstrong, W. D. and Simon, W. J.: Penetration of Radiocalcium at Margins of Acrylic Restorations Made by Compression and Noncompression Techniques. J.A.D.A. 47:636, Dec. 1953.
10. Crawford, W. H. and Larson, J. A.: Fluid Penetration Between Fillings and Teeth Using Ca^{45}. J. D. Res. 35: 518, Aug. 1956.
11. Going, R. E.: Marginal Penetration of Dental Restorations as Studies by Dyes and Radioactive Isotopes. Master of Science Thesis, University of Illinois, 1959.
12. Grossman, L. I.: A Study of Temporary Fillings as Hermetic Sealing Agents. J. D. Res. 18:67, Feb. 1939.
13. Massler, M. and Ostrovsky, A.: Sealing Qualities of Various Filling Materials. J. Dent. for Child. 21:228, 4th Quarter 1954.
14. McElroy, D. L.: Physical Properties of Root Canal Filling Materials. J.A.D.A. 50:433, Apr. 1955.
15. Dow, P. R. and Ingle, J. I.: Isotope Determination of Root Canal Failure. Oral Surg., Oral Med., Oral Path. 8:1100, Oct. 1955.
16. Schroeder, A : The Problem of a Bacteria Proof Root Canal Treatment. Zahn Welt und. Zahn. Reform. 19: 531, Oct. 1957.
17. Stewart, G. G.: A Comparative Study of Three Root Canal Sealing Agents. Oral Surg., Oral Med., Oral Path. 11:1029, 1174, Sept. and Oct. 1958.
18. Wasserman, F., Blaney, J. R., Groetzinger, C. and De Witt, T. G.: Studies on the Different Pathways of Exchange of Minerals in Teeth with the Aid of Radioactive Phosphorus. J. D. Res. 20:389, Oct. 1941.
19. Rickert, U. G.: Fundamentals of Successful Root Canal Treatment. J.A.D.A. 14:1657, Sept. 1927.
20. Nygaard, Ostby, B.: Uber die Gewebsveranderungen in apikalen Paradentium des Menschen nach Verschiedenartigen Eingriffen in den Wurzelkanalen. Det Norske Videnskaps—Academi i Oslo. 1939, No. 4. (Nye studier. Det Norske Videnskaps—Academi i Oslo, 1944, No. 2.)
21. Grossman, L. I.: Current Progress in Endodontic Therapy. Int. Dent. J. 9:20, Mar. 1959.
22. Marshall, F. J.: Permeability of Dentin and Root Canal Fillings to Radioisotopes. Master of Science Thesis, University of Illinois, 1959.
23. Gross, J., Rogoroch, R., Nadler, N. J. and Leblond, C. P.: Theory and Methods of the Radiographic Localization of Radioelements in Tissues. Am. J. Roent. 65: 420, Mar. 1951.
24. Fusayama, T., Watanable, K. and Inaba, T.: Half-thickness of Dentin to p^{32} Beta Radiation. J. D. Res. 38:84, Jan.-Feb. 1959.
25. Ingle, J. I.: Root Canal Obturation. J.A.D.A. 53:47, July 1956.

LE OBTURATION DE DISPULPATE DENTES, EVALUTATE PER MEDIO DE RADIOISOTOPOS

Dr. med. dent. F. James Marshall (M.S.), Dr. med. dent. Maury Massler (M.S.)

SUMMARIO IN INTERLINGUA

Le endodontistas se trova generalmente de accordo que le canal de radice de un dente sin pulpa debe esser obturate complete—e permanentemente. Tamen, le numerose materiales e methodos usate in replenar le canales de radice ha rarmente essite testate per medios experimental. Un documentate evidentia deberea reimplaciar le impression clinic e le indirecte indicios clinic que es currentemente usate como base in le selection del procedimento endodontic. Le radioisotopos offere un delicate e accurate instrumento pro testar le capacitate de diverse materiales de obturar le canales.

Un total de 261 frescamente extrahite dentes uniradical human esseva usate in le presente investigation. Le canales esseva replenate secundo un varietate de technicas—con le uso de duo differente punctas (guttapercha e argento) e quatro differente obturantes. Guttapercha esseva etiam paccate in micre pecias ad in le canal.

Canales de radice replenate per un sol ben-adaptate puncta de guttapercha o per un puncta de argento sin obturante non esseva adequatemente claudite contra le penetration de iones ab le interior del dente. Solmente minor differentias esseva trovate in le efficacia obturatori del varie obturantes usate. Un puncta de guttapercha sin obturante resultava in un replenation superior a illo de un puncta de argento. Il esseva possibile obturar un canal de radice completemente e in 100% del casos contra le ingresso marginal de mesmo un micre amonta de iones radioactive per le appropriate uso de un puncta de guttapercha con un efficace obturante. Inter le diverse radioisotopos usate, S^{35} esseva le melior traciator pro studiar le obturation de canales de radice a causa del excellente detalio e del profunde penetration que illo monstrava in le autogramma.

THE BACTERIAL FLORA OF DISEASED PULP

INO SCIAKY, D.M.D.* and ADA SULTZENU, M.Sc.

INTRODUCTION

Although the bacteriological population of diseased pulps has often been investigated (1, 2, 3, 4, 5), the results of these investigations differ widely. One is often at a loss as to the weight that can be given to these findings although the result may very much affect the method of approach to root canal treatment. Authors are not united as to the importance of the flora of root canals in relation to the end result of their treatment. If one would simplify to the extreme, one might divide endodontists into those who think that the root canals as well as the periapical region should be sterile, before root canal filling could be considered, and those who assume, that once the canals have been properly mechanically prepared and flushed, an accurate and impervious root canal filling gives the best expectancy for sound repair, and that bacteriological sterility is of only academic interest.

A series of investigations were conducted to determine some basic elements on which one could make a logical evaluation of the importance of the various steps that are accepted procedures in endodontia. We present here the bacteriological findings in root canals of diseased pulps at the first opening of the pulp chamber and before any treatment was made.

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MATERIALS AND METHODS

This investigation was conducted on patients treated at the Dental Clinic of our School either by students or by qualified dentists. Teeth treated included incisors, canines, premolars as well as first and second molars.

The teeth to be treated were isolated from the oral cavity by rubber dam held by a clamp. The area around the tooth and the tooth itself were disinfected with an alcoholic solution of iodine. Most of the carious tissues were removed prior to the placing of the rubber dam. All the instruments used in the opening of the tooth and other procedures were washed in a detergent and sterilized either in a dry sterilizer at 160°C or autoclaved at 126.6°C for twenty minutes. Sometimes, during treatment, the instruments were also disinfected by flaming.

Two cultures were taken from each root canal, either with sterile paper points or cotton wrapped Miller needles. In multi-rooted teeth, points were placed in each canal, then collected together, and considered as a single culture. One point was dropped in an anaerobic medium, and the third, taken directly from the batch of paper points or Miller needles, was used as a control for sterility.

TABLE I—AEROBIC* MICROORGANISMS ISOLATED FROM ROOT CANALS IN PURE OR MIXED CULTURES

Single Aerobic Microorganism		*Combination of two Aerobic Microorganisms*		*Combination of three Aerobic Microorganisms*	
Number	*%***	*Number*	*%*	*Number*	*%*
198	55.0	102	28.3	20	5.6

* This group includes also microaerophiles.

** Calculated from total number of positive isolations.

MEDIA

Two kinds of fluid media were used for preliminary isolation: Difco Brain Heart Infu-

sion broth and Difco Thioglycollate containing 0.1% Agar and 1% glucose. Difco Blood Agar Base plates containing 5% human blood were used for transfer. In special cases the following media were also used: Mac Conkey's Agar, Koser-Citrate Agar, Clarck-Lubbs broth, Tomato Juice Agar, Urea Broth, Brain-Heart Agar, Litmus Milk, Kligler-Iron Agar, and various sugar containing media.

All media were prepared from Difco dessicated preparations and autoclaved according to instructions. Fluid media were always tested for sterility before use.

in anaerobic conditions but grew subsequently aerobically were not included in the anaerobic group.

FINDINGS

Out of 409 cultures taken from root canals at the first opening of the pulp chamber and before root canal treatment, 360 or 88% were positive and 49 or 12% were negative. Out of the 360 positive cultures, 320 contained various combinations of aerobic microorganisms and 40 either purely anaerobic or a combination of anaerobic and aerobic microorganisms.

TABLE II—STRICT ANAEROBES ISOLATED FROM ROOT CANALS IN PURE OR MIXED CULTURES OR IN COMBINATIONS WITH AEROBIC MICROORGANISMS

Single Anaerobic Microorganism		*Combination of two Anaerobic Microorganisms*		*Different combinations of Anaerobic Microorganisms with Aerobes*		*Total Number 409*			
						Positive Cultures		*Negative Cultures*	
Number	%	Number	%	Number	%	No.	%	No.	%
12	3.3	6	1.7	22	6.1	360	88	49	12

INCUBATION

Inoculated media were incubated at least 48 to 72 hours at 37°C. The negative ones were kept an additional five days. The thioglycollate test tubes were also kept for 5 more days in the incubator and stains repeated for possible appearance of slowly growing anaerobes.

IDENTIFICATION

After primary incubation, smears were prepared from fluid media and Gram stained. Transfers were made to suitable enrichment or selective media on the basis of morphological determination. Additional properties of organisms were tested according to methods suggested in Bergey's Manual (6).

Strictly anaerobic microorganisms were identified only from morphological appearance. Spray dish method was used for their isolation. The air was removed by chemical methods using Pyrogallol and NaOH. The catalase negative microorganisms which were primarily isolated

TABLE III—SINGLE AEROBIC MICROORGANISMS ISOLATED FROM ROOT CANALS' CULTURES

Type of Microorganism	*Total Number*	
	Number	*%*
Streptococcus viridans	76	38.4
Gamma Streptococcus	71	35.9
Micrococcus pyogenes var. aureus	15	7.6
Micrococcus pyogenes var. albus	3	1.5
Beta hemolytic Streptococcus	3	1.5
Sarcina	2	1.0
Gaffkya tetragena	1	0.5
Neisseria	1	0.5
Diphtheroids	4	2.0
Lactobacillus acidophilus	8	4.1
Serratia marcescens	1	0.5
Actinomyces	6	3.0
Yeast	4	2.0
Unidentified gram negative rods	2	1.0
Unidentified gram positive rods	1	0.5
	198	100%

Details of the various combinations can be found in Table I and II. An effort was made to identify the microorganisms involved in each of the groups and the findings are described in Tables III-VIII.

TABLE IV—COMBINATIONS OF TWO MICROORGANISMS ISOLATED FROM ROOT CANALS' CULTURES

*Microorganisms**	*Total Number* Number	%
Streptococcus with Streptococci	9	8.8
Streptococcus with Micrococcus pyogenes	21	20.5
Streptococcus with other Micrococci	6	5.9
Streptococcus with Enteric rods	10	9.8
Streptococcus with gram positive rods	33	32.4
Streptococcus with Actinomyces	8	7.8
Streptococcus with yeast	9	8.8
Micrococcus pyogenes with gram positive rods	2	2.0
Micrococcus pyogenes with Neisseria	1	1.0
Yeast with gram negative rods	1	1.0
	102	100%

* Because of different combinations the type of accompanying organism was not noted in the table.

TABLE V—COMBINATION OF THREE AEROBIC MICROORGANISMS ISOLATED FROM ROOT CANALS' CULTURES

*Microorganisms***	*Total Number* Number	%
Streptococcus viridans with 2 organisms	14	70.0
Gamma Streptococcus with 2 organisms	3	15.0
Beta Hemolytic Streptococcus with 2 organisms	3	15.0
	20	100%

** Owing to the variability of combinations the type of accompanying organism was not noted in the table

TABLE VI—SINGLE ANAEROBIC MICROORGANISM ISOLATED FROM ROOT CANALS' CULTURES

Microorganism	*Total Number* Number	%
Anaerobic Streptococcus	6	50.
Actinomyces	3	25.
Anaerobic gram positive rods unidentified	2	16.7
Veillonella	1	8.3
	12	100%

DISCUSSION

This investigation as stated previously, was not made to determine the value of sterilization or methods of sterilization of root canals to the final results obtained in endodontic treatment. It is a statement of facts. For reasons that are difficult to explain, the number of negative first cultures obtained in our investigation (12%) was much smaller than those of Ostrander and Crowley (40.4%), Morse and Yates (53%), Bender (38%) or Sommer and Crowley (48.7%). This difference, in our investigation cannot be accounted for by the fact that we used both aerobic as well as anaerobic media. If we take the number of cases showing only anaerobic growth (18 cases or 4.4% of total number of cultures) and add it to the total percent of negative growths, this would still leave a much higher percentage of infectivity in our investigation. Two other factors may perhaps give a clue to this difference. As described before, two cultures were taken from each canal. This may have given a better chance for positive cultures in cases where the number of microorganisms was small. Besides, microorganisms in low concentration have a greater chance to grow in thioglycollate than in aerobic broth. The second point that comes to mind is the fact that a great variety of infected teeth was examined and that they included a large number of multirooted teeth up to the second molar. In our case, the conclusion would be that out of 10 teeth considered for endondontic treatment 9 are infected.

Another finding that may present some interest is that out of all positive cases, 11% are made up by either purely anaerobic or a combination of anaerobic and aerobic microorgan-

isms. If we examine the various combinations of microorganisms present in the positive cases, we see that in more than one half of our findings (58.4%) a single organism is present. This may be either an aerobe (55%) or an anaerobe (3.3%). In about one third of the cases (30%) two organisms are present. Either two aerobes (28.3%) or two anaerobes (1.7%), and in only 11.7% do we have more than two different organisms. There is little truth in the idea of a very mixed or rich flora in infected pulps.

TABLE VII—COMBINATIONS OF TWO OR THREE ANAEROBIC MICROORGANISMS ISOLATED FROM ROOT CANALS' CULTURES

Microorganism	*Total Number* *Number*	*%*
Anaerobe with Anaerobe	4	66.6
Anaerobe with two Anaerobes	2	33.4
	6	100%

In most cases, when one single aerobic organism was found, it belonged to the viridans or the gamma-streptoccocus group (74.3%). 2% were yeast, and only 1.5% of single cultures were made up of beta-hemolitic-streptoccoci (see Table III). When investigating the findings among single anaerobic strains it is difficult to discuss percentages because of the small number involved and because they were only investigated morphologically. It is still of some interest that one half of the findings were anaerobic streptococci and 25% were actinomycetes (Table VI).

CONCLUSION

One may say that if the selection of teeth for endodontic treatment is not limited to the first stages of infection, but also includes gangrenous teeth, then 9 out of 10 involved teeth are infected. Out of all infected teeth, more than 10% are caused by purely anaerobic or a combination of anaerobic and aerobic microorganisms. This would lead us to think that purely aerobic media do not fulfill the needs for the determination of sterility of root canal environment if the need for sterility is taken as a prerequisite. Furthermore, close to 60% of the infected canals contain only one type of microorganism, 30% two types. Out of all microorganisms, both in single and combined cultures, streptoccoci are the most frequently found.

TABLE VIII—DIFFERENT COMBINATIONS OF ANAEROBIC AND AEROBIC MICROORGANISMS

Microorganism	*Total Number* *Number*	*%*
Anaerobe with one aerobe	12	54.6
Anaerobe with two aerobes	8	36.4
Two Anaerobes with two aerobes	1	4.5
Anaerobe with three aerobes	1	4.5
	22	100%

BIBLIOGRAPHY

1. Ostrander, F. D. and Crowley, Mary C.: The Effectiveness of Clinical Treatment of Pulp Involved Teeth as Determined by Bacteriological Method. Jour. Endodont. 3, 6, 1948.
2. Hayes R. L.: Clinical and Bacteriological Study of 340 Pulp Therapy Cases. J. Dent. Res., 22, 301, 1943.
3. Morse F. W. J. and Yates M. F.: Follow up Studies of Root-Filled Teeth in relation to Bacteriologic Findings. J. Am. Dent. Ass. 28, 956, 1941.
4. Gruchalla, F. Y. and Homann, C. B.: Root Surgery. J. Missouri Dent. A. 27, 229, 1947.
5. Clinical Endodontics, Saunders, p. 107, 1956. Sammer, Ostrander, Crowley.
6. Bergey's Manual of Determinative Bacteriology. 7th Ed. 1957.
7. Spray, R. S.: An improved Anaerobic Culture Dish. J. Lab. & Clin. Med. 16, p. 203, 1930.

LE FLORA BACTERIAL DE PULPA MORBIDE

Dr. med. dent. Ino Sciaky, Ada Sultzenu (M.Sc.)

SUMMARIO IN INTERLINGUA

Ben que le population bacterial de pulpas morbide ha frequentemente essite investigate, le resultatos de tal investigationes differe marcatemente. Le autoritates non se trova de accordo con respecto al importantia del flora del canales de radice pro le ultime resultato de lor therapia.

Un serie de investigationes esseva effectuate pro determinar certe elementos fundamental a base del quales il esserea possibile evalutar systematicamente le signification del varie mesuras que es routinarimente acceptate in le practica endodontic. Es presentate le constatationes bacteriologic in canales de radice in casos de pulpa morbide al momento del prime penetration in le camera de pulpa, ante le institution de ulle tractamento.

Si le selection de dentes pro therapias endodontic non es restringite al prime stadios del infection sed si etiam dentes jam gangrenose es includite, le effecto statistic es que 9 ex omne 10 dentes es inficite. In plus que 10% de omne le inficite dentes, le agentes etiologic del infection es micro-organismos purmente anaerobie o un combination de anaerobies e aerobies. In plus, approximativemente 60% de omne le inficite canales contine un sol typo de micro-organismo; 30% contine duo. Inter omne le micro-organismos trovate (sol o in combination), streptococcos es le plus frequente.

* * *

NEW COMPUTER FOR NATIONAL LIBRARY OF MEDICINE

Dr. Luther L. Terry, Surgeon General of the Public Health Service, announced that a contract has been signed with the General Electric Company for the development of an electronic information storage and retrieval system at the National Library of Medicine, to be known as MEDLARS (Medical Literature Analysis and Retrieval System).

The new computer-based system will enable the National Library of Medicine to broaden and accelerate its services to medical education, research and practice. The Library, which this year observes its 125th anniversary, is responsible for acquiring, indexing, storing and disseminating world literature relating to the medical sciences, and constitutes the largest collection of scientific medical literature in the world.

The basic publication of the National Library of Medicine is the *Index Medicus,* a monthly bibliography of world medical literature which during the past year listed some 125,000 items representing scientific publications of 77 different countries in 30 languages. The Library also publishes special bibliographies and conducts an inter-library loan service which has disseminated as many as 11,000 separate articles, on request, during a single month.

Dr. Frank B. Rogers, Director of the Library, pointed out that the MEDLARS system is a pioneering venture in relation to conventional library practices. "There have been other efforts in the bibliographic field, with systems using electronic computers, but none approaching the size of this one," Dr. Rogers said.

"Our present system, which is part manual and part mechanized, is designed to turn out a single product—the *Index Medicus.* In contrast, MEDLARS will give us the flexibility we need to meet other national requirements. We will be able to produce by machine, quickly and efficiently, specialized bibliographies to meet specific requests. If someone asks us for a bibliography of publications on a single disease category, for example, MEDLARS will be able to sort out and reproduce a list chosen from over a million possible articles in a very short time.

It is estimated that the development, installation and testing of the MEDLARS project will take about two years. The new building of the National Library of Medicine adjacent to the National Institutes of Health in Bethesda, Maryland, which will be ready for occupancy late this year, will be adapted to incorporate the MEDLARS equipment.

PRENATAL AND POSTNATAL INGESTION OF FLUORIDES — FOURTEEN YEARS OF INVESTIGATION — FINAL REPORT*

REUBEN FELTMAN, D.D.S.† and GEORGE KOSEL, B.S., M.S.‡

INTRODUCTION

In previous publications[1, 2] evidence was presented showing that the ingestion of fluorides during the formative stages of amelogenesis did, in fact, have an effect on the developing dentition, that the element was retained in blood and certain soft tissues and that a small percentage of patients manifested adverse systemic reactions. The data presented in this report confirm and extend the findings in a larger number of subjects.

METHOD

Three different sources of fluorides were used in this study. The tablets containing 1.0 mgm. fluorine ion from CaF_2; 1.2 mgm. fluorine ion, from NaF and 0.825 mgm. fluorine ion from Na_2PO_3F, each. These values were chosen so that each tablet would contain approximately the same amount of the ion and to supply an optimum amount of daily dietary supplement.

The measured doses of these salts were ingested by gravid women and by children through their eighth year of life, or during the periods of dental enamel formation. These tablets could be dissolved in the mouth, dissolved in any liquid or could be chewed, depending on the individual's preference or ability. One tablet daily was prescribed.

There was no selection of the patients included in this study, they were patients utilizing the facilities of the hospital, coming from all walks of life and all ethnic groups. The controls were patients chosen at random from the above group who received no known supplemental fluoride. The water in the study area is fluoride free.

In the analytical phase of this study, the fluoride was first isolated from these tissues by the Willard-Winter procedure[3] and then determined by the Williams titration[4] as modified by Smith and Gardner.[5]

This report on the analytical section presents the findings obtained from prenatal cases in which analysis were made of placental tissue from 332 study cases with 251 controls (tables I and III) and of cord blood from 361 cases with 240 controls, (tables I and II) followed by the clinical findings from 672 cases with 461 controls (table IV).

RESULTS

The storage of fluoride occurring in the soft tissue examined in this study varies over a wide range. This is shown in table I in which the concentration of fluoride is expressed in micrograms fluorine ion per 100 grams or 100 millilitres of tissue.

The data extending over so wide a range compelled us to determine in more detail the concentration found in each analysis. This is shown in tables II and III in which the fluoride concentration found in 100 millilitres of blood and in 100 grams of tissue is shown.

Three placentas were obtained at random and analysed completely for their fluoride content. The results are represented diagrammatically in Figs. I, II, and III.

The effects of the ingestion of dietary fluoride supplement given at varied ages of life on the incidence of dental caries is shown in table IV. Table V shows the results reported in another tablet study[6] and in three fluoridated water areas which, compared with our results shown in table IV demonstrate the efficacy of early dietary fluoride supplementation.

DISCUSSION

The average fetal blood fluoride concentration (table I) in the tablet study group was: in the CaF_2 group, 44.8 mcg/100cc; NaF

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FIGURE II

FIGURE I

WHOLE PLACENTAS

T.B., 8-4-53
"Enziflur," 2-8-52

■ = mcg. F/100 Gm. tissue
■ = Code No. of tissue section

(Not an accurate reproduction)

Weight: 667.45 Gm.
Average: 102.1 mcg. F/100 Gm. placenta

FIGURE II

WHOLE PLACENTAS

(Control)

J.G., 7-16-53

■ = mcg. F/100 Gm. tissue
■ = Code No. of tissue section

(Not an accurate reproduction)

Weight: 612.23 Gm.
Average: 141.1 mcg. F/100 Gm. placenta

group 32.68 mcg/100cc and the Na_2PO_3F group, 26.85 mcg/100cc. In the controls, 12.9 mcg/100cc.

The average placental tissue fluoride concentration in the tablet study group was: NaF group, 149.2 mcg/100 gms; CaF_2 group, 109.1 mcg/100 gms and Na_2PO_3F group, 107.8 mcg/100 gms. In the controls, 105.8 mcg/100 gms.

In the tablet study group, the average cord blood concentration and the average placental tissue concentration was higher than in the controls. Examination of tables II and III reveals the wide spread in the data. There is a marked difference in the F^- concentration between study and control cases in the cord blood (table II), the difference in the placental tissue is not as marked except in the NaF cases (table III).

Of interest is the finding that in no case was a fluoride concentration in placental tissue below 25 mcg/100 gms in either the CaF_2 or NaF cases.

The recovery of high F^- concentrations in control placenta tissue analysis puzzled us for a period of time. As a result, microdeterminations of fluoride content of pharmaceuticals prescribed as prenatal medication were done. Thirty nine prescription items were obtained and analysed. It was found that an occult supply of fluoride was being used, there being no mention made of fluoride content as a 'constituent on the labels of many of the products.'

Six samples of placental tissue were inadvertently left out of the refrigerator in Morristown, an artificially fluoridated city (tables II and III). Upon analysis, it was found that the fluoride, had, to a marked degree left the tissue. It was found in the liquid resulting from the autolysis. This, although on a small number of cases, 6 in number, causes us to surmise that fluoride may be a function of intracellular activity.

The data presented demonstrates that fluoride is present in the placenta, reaching that tissue via the metabolic process, it is stored there with the higher concentrations in the periphery and

TABLE 1
AVERAGES AND RANGES

SOURCE OF FLUORIDE	BLOOD (mcg. F/100 Ml.)	PLACENTA (mcg. F/100 Gm. Tissue)
Na_2PO_3F	Range: 4.7-131.6 Average: 26.85	Range: 18.6-340.8 Average: 107.8
CaF_2	Range: 23.2-90.4 Average: 44.8	Range: 37.2-197.6 Average: 109.1
NaF	Range: 4.4-225.6 Average: 32.68	Range: 26.4-784.0 Average: 149.2
CONTROLS	Range: 0.34-292.0 Average: 12.9	Range: 15.9-764.0 Average: 105.8

TABLE 2
FLUORIDE CONCENTRATION IN MCG. F/100 ML. IN CORD BLOOD

SOURCE OF FLUORIDE	NO. OF CASES	RANGE									
		0-10	10-25	25-50	50-75	75-100	100-150	150-200	200-400	OVER 400	
NaF	162	30	63	45	9	0*	9	0	6	0	Range: 4.4-225.6 Average: 32.68
CaF_2	100	0	29	41	8	22	0	0	0	0	Range: 23.2-90.4 Average: 44.8
Na_2PO_3F	99	21	39	12	13	13	1	0	0	0	Range: 4.7-131.6 Average: 26.85
CONTROLS	240	94	104	29	6	2	3	1	1	0	Range: 0.34-292.0 Average: 12.9
MORRISTOWN WATER	19	5	5	3	3	1	1	1	0	0	Range: 4.4-127.0 Average: 34.0
CONTROLS	9	2	3	3	1	0	0	0	0	0	Range: 8.4-38.2 Average: 24.7
WATER AUTOLYSED	6	1	1	3	1	0	0	0	0	0	Range: 5.9-45.9 Average: 26.1

that it passes the placental barrier to enter the foetal blood supply. From the foetal blood supply it enters into the enamel complex of the forming teeth, in a manner as yet not known.

The data presented in table IV shows the effects of prenatal fluoride ingestion as compared to the postnatal dietary flouride ingestion as well as the lack of it in controls. Shown is the effect on the dental caries incidence in 228 cases where the fluoride was ingested prenatally and postnatally, 162 cases where it was ingested prenatally but not postnatally, 282 cases where it was instituted at various starting ages as compared with 461 controls.

At seven years of age, dental caries is non-existant in cases where the mother and child both ingested the supplement. At nine years of age, the deciduous dentition was afflicted with .2 def and the permanent dentition over 80% caries free. Incidentally, caries, when it appeared, involved posterior teeth only and either the occlusal or buccal surfaces. Rarely, in these cases have we observed compound cavities.

In those cases where the child had no supplemental fluoride postnatally, but did, prenatally, more caries occurred than in those who ingested it prenatally and postnatally, as can be seen in the table IV, but much less than in the controls.

The same picture is seen when the fluoride is administered postnatally, at various ages, but the earlier begun, the fewer the caries experience.

The question of the insolubility of CaF_2 is of interest. CaF_2 is 16 PPM soluble in water. That it dissociates is demonstrated by the fact the bone meal products and phosphates given in infant feedings cause dental fluorosis. My own children are so affected. We obtained gastric juice from six cases, maintained it at 37°C, added CaF_2 and analysed it. It was found that in gastric juice, with its low pH, that CaF_2 was 50 PPM soluble.

We have encountered a few cases of dental fluorosis, questionable to very mild, according to Dean & Arnolds' classification[8] in the per-

manent and deciduous dentition. As a result of this occurrence in the permanent dentition we do not give supplementary dietary fluoride to infants whose mothers ingested fluorides during pregnancy until the end of the 6th month of life. We have also reduced the dosage given to children up to the end of their second year of life to 0.5 mgm F/day. This has resulted in the elimination of the incidence of this affliction.

Within a period of six weeks after the institution of the fluoride tablet therapy, a noticeable elimination occurs of the materia alba attached to the teeth of the children. We advise that when the child is old enough to understand and cooperate that the tablet be dissolved in the mouth or chewed, thus giving a topical as well as systemic effect to the therapy.

One percent of our cases reacted adversely to the fluoride. By the use of placebos, it was definitely established that the fluoride and not the binder was the causative agent. These reactions, occurring in gravid women and in children of all ages in the study group affected the dermatologic, gastro-intestinal and neurological systems. Eczema, atopic dermatitis, urticaria, epigastric distress, emesis, and headache have all occurred with the use of fluoride and disappeared upon the use of placebo tablets, only to recur when the fluoride tablet was, unknowingly to the patient, given again. When adverse reactions occur, the therapy can be readily discontinued and the patient or parent advised of the fact that sensitivity exists and the element is to be avoided as much as possible.

With regular frequency, families with varied numbers of children are seen where the mother took a fluoride dietary supplement during pregnancies with some children and did not with others. The clinical findings are the same as shown in table IV.

The results of our study compared with the data in table V are readily observable. The prenatal value is readily discernable as well as is the benefit to be derived from early supplementation.

TABLE 3
FLUORIDE CONCENTRATION IN MCG. F/100 GM. IN PLACENTAL TISSUE

SOURCE OF FLUORIDE	NO. OF CASES	RANGE									
		0-10	10-25	25-50	50-75	75-100	100-150	150-200	200-400	OVER 400	
NaF	141	0	0	33	30	12	27	9	21	9	Range 26.4-784 Average 149.2
CaF_2	91	0	0	31	19	20	11	10	0	0	Range 37.2-197.6 Average 109.1
Na_2PO_3F	100	0	5	21	34	14	9	11	6	0	Range 18.6-340.8 Average 107.8
CONTROLS	251	1	22	74	67	29	17	20	16	5	Range 15.9-764 Average 105.8
MORRISTOWN WATER	19	0	0	5	6	4	1	2	1	0	Range 33.6-358 Average 90.7
CONTROLS	8	0	1	1	2	4	0	0	0	0	Range 15.9-91.6 Average 76.2
AUTOLYSED	6	0	1	3	1	1	0	0	0	0	Range 18.9-75.2 Average 39.5

TABLE 4-A

def and DMF RATES IN 618 STUDY CASES AS COMPARED WITH RATES FOUND IN 461 CONTROLS

NO. CASES	STARTING AGE	AVERAGE def and DMF AT AGES 3-12										
		3	4	5	6	7	8	9	10	11	12	
46	under 3	0 -	0 -	0 -	.04 0	.09 0	0.2 0	0.38 0.5	- 1.1	- 1.35	- 1.7	def/child DMF/child
39	3	0.1 -	0.14 -	0.2 -	0.2 0	0.25 0	0.27 0.2	0.5 0.7	- 1.2	- 1.5	- 1.8	def DMF
38	4	* -	0.45 -	0.47 -	0.44 0.1	0.66 0.21	0.91 0.29	1.03 0.36	- 1.8	- 2.0	- 2.4	def DMF
47	5	 -	- -	1.2 -	1.33 0.4	1.54 1.0	0.99 1.0	1.09 1.4	- 1.9	- 2.49	- 2.6	def DMF
38	6	- -	- -	- -	2.1 .5	2.6 .8	2.9 1.2	2.7 1.7	- 2.2	- 2.5	- 2.65	def DMF
39	7	- -	- -	- -	- -	3.2 1.0	3.5 1.46	2.9 2.0	- 2.4	- 2.9	- 3.2	def DMF
35	8	- -	- -	- -	- -	- -	3.9 1.9	3.7 2.1	- 2.5	- 2.9	- 3.3	def DMF

TABLE 4-B

def and DMF RATES IN 618 STUDY CASES AS COMPARED WITH RATES FOUND IN 461 CONTROLS

	AVERAGE def and DMF AT AGES 3-12										
AGE:	3	4	5	6	7	8	9	10	11	12	
PRENATAL NOT POSTNATAL 162 CASES	0 -	0 -	0 -	0.2 0.1	0.5 0.9	1.0 1.3	1.5 1.7	0.5 2.0	0.3 2.6	0.3 2.9	def DMF
PRENATAL AND POSTNATAL 228 CASES	0 -	0 -	0 -	0 0	0 0	.09 0	.2 .12	.03 .19	.03 .24	.01 .38	def DMF
CONTROLS 461 CASES	33	29	39	51	49	49	54	52	46	59	
	2.	4.0	4.1	4.5	4.7	5.4	6.3	3.4	2.0	1.4	def
	3.	7.6	7.1	7.8	8.6	10.0	10.3	5.1	3.8	2.0	defs
	-	-		2.0	2.5	3.2	4.0	4.6	4.9	5.8	DMF
	-	-	-	2.0	3.5	3.8	6.4	7.0	7.2	9.4	DMFS

In prenatal cases, where the ingestion of dietary fluorides is begun during the first two trimesters of pregnancy, the favorable effect on the incidence of dental caries is quite evident; whereas when it is begun during the last trimester, the effects are not as pronounced.

This may be due to the fact that the element has not been in intimate association with the forming teeth to become a part of the calcifying structures that form early, and which are in the areas of more susceptibility to caries, normally the occlusal surfaces and contact points of the deciduous teeth and the beginnings of the occlusal surfaces of the 1st permanent molars.

Exfoliated teeth and teeth lost through accidents have been analysed for their fluorapatite contents. Those examined at Indiana University[9] have not demonstrated its presence. Reports on others sent out for analysis to determine the presence of fluorapatite have not, as yet, been received. Theoretically, calcium fluorapatite should be an end product of fluoride ingestion during the formative periods of amelogenesis. All methods for its determination that are available to Dr. Muhler have failed to reveal its presence in any of the specimens available from this study. Clinically, a visible difference in the appearance of the enamel is apparent. The teeth are opalescent, highly glistening somewhat like the inside of an oyster shell, with shallow, well fused grooves and fissures that resist to a marked degree the forces causing dental caries. It may be inferred that the fluoride influences the pituitary in a favorable manner since this gland is related to normal tooth morphology.[10]

Abortions have been examined microscopically for possible aberrations to the developing dental structures during embryonal and foetal development. None have shown any abnormalities.

Blood studies comparing the red blood count, white blood count and differential, hemaglobin, bleeding and clotting time have revealed no unusual effects or differences between study cases and controls in 250 examinations.

The mode of action by Fluoride on teeth is unknown. That benefits are derived from its ingestion during the period of tooth formation is quite evident. To attribute all of the benefits as shown in this study to it alone would be erroneous. Patients interested in the dental well being of their children utilize other measures, such as the reduction in refined sugar and carbohydrate intake, use of oral hygiene measures and regular visits to their dentists.

There being a delay in the eruption of the teeth, in some cases by as much as a year from

TABLE 5

MEAN NUMBER OF DMF AND def TEETH OF CHILDREN WHO INGESTED NaF TABLETS AND DATA REPORTED FROM OTHER STUDIES, AFTER TEN YEARS OF FLUORIDATION AND AFTER USE OF A NATURAL FLUORIDE WATER*

AGE GROUPS	NaF TABLETS		AURORA, ILLINOIS*		GRAND RAPIDS, MICHIGAN†				BRANTFORD, ONTARIO†	
					Base Line		10 yrs. of F			
	def ± SE	DMF ± SE	def	DMF	def	DMF	def	DMF	def	DMF
4- 5.....	1.2 ± 0.6	.....	2.7	.....	5.2	.....	2.5	.....	2.6	.....
6- 9.....	1.8 ± 0.4	0.6 ± 0.2	3.4	0.8	5.8	2.3	3.1	1.0	3.4	0.9
10-12.....	0.9 ± 0.3	2.2 ± 0.5	1.3	2.5	1.5	6.5	1.6	2.9	1.4	2.8
13-15.....	.....	4.5 ± 0.9‡	.....	3.8	.....	11.0	.....	6.7	.....	5.0

* Aurora - a natural fluoride water.
† Grand Rapids and Brantford - fluoridated water.
‡ Five of this group were caries-free.

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the accepted eruption dates, this may be a factor in the lesser incidence of decay. The teeth delayed in eruption have the opportunity to mature more prior to becoming exposed to the forces that trigger the caries mechanism. Becks and Baume[11] and De Eds[13] report that fluoride is a thyroid inhibitor and that hypothyroidism delays the eruption of the teeth.[12, 13]

From the data reported in this paper and in reports by others, it is evident that much investigation is needed on the biological effects of ingested fluorides.

SUMMARY

Data is presented showing that fluoride ingested by gravid women enters the maternal circulation, is stored in the placenta and passes through the placental barrier to enter the foetal blood supply.

Evidence is presented that the fluoride in the foetal blood supply affects the developing teeth to make them more resistant to dental caries.

No unusual effects have been observed on the blood pictures of children who ingested fluoride.

One percent of our cases presented evidence of undesirable side effects from fluoride therapy. It is pointed out that if a patient is affected by the fluoride, by this method, the allergen or intoxicant can be removed readily from

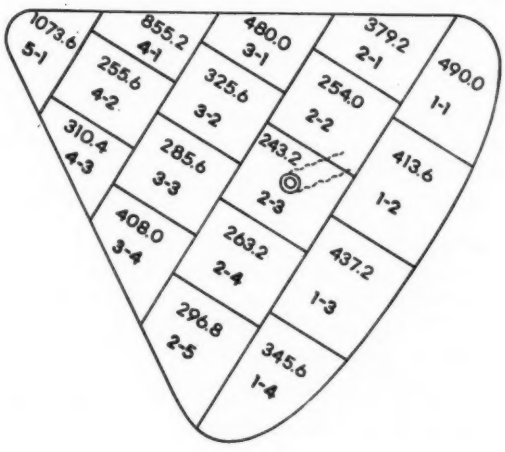
FIGURE III

WHOLE PLACENTAS

(Sodium Fluoride)

G.L., 12-19-53 ■ = mcg. F/100 Gm. tissue

■ = Code No. of tissue section



(Not an accurate reproduction)

Weight: 427.55 Gm.

Average: 418.6 mcg. F/100 Gm. placenta

the diet by discontinuance of the dietary supplement.

Beneficial results to the dentition are demonstrated. Dental fluorosis has been observed and eliminated by adjusting the dosage. Fluorides ingested during the first or second trimester of pregnancy produce benefits as seen in the incidence of dental caries, and have been found of no value if begun in the third trimester.

The mode of action of fluoride is unknown.

A delay in the eruption of the teeth occurs.

It is pointed out that much more study on the Biological effects of ingested Fluoride is necessary.

BIBLIOGRAPHY

1. Feltman, R., and Kosel, G., Prenatal ingestion of fluorides and their transfer to the foetus. Science, 122: 560-561 (1955).
2. Feltman, R., Prenatal and postnatal ingestion of fluoride salts: A progress report. Dental Digest, 62:353-357 (1956).
3. Willard, H. H., and Winter, O. B., Volumetric method for determining fluorine; Ind. Eng. Chem. Anal Edit., 5:7-10 (1933).
4. Williams, H. A.; Titration of microgram quantities of fluoride; Analyst, 71:175 (1946).
5. Smith, F. A.; and Gardner, D. E.; Investigations on metabolism of fluoride; Determination of fluoride in blood, Jnl. Dent. Res., 30:182-188 (1951).
6. Arnold, F. A.; McClure, F. J., and White, C. L., Sodium fluoride tablets for children. Dent Progress 1:12-16 (1960).
7. Feltman, R., and Kosel, G., Fluoride in pharmaceutical preparations; Northwest Medicine, 55:663-664 (1956).
8. Dean, H. T. and Arnold, F. A.; Endemic dental fluorosis or mottled enamel; Jnl. Amer. Dent. Assoc. 30: 1278-1283 (1943).
9. Muhler, J. C.; Personal Communications.
10. Baume, L. J., and Becks, H.: Hormonal control of tooth eruption: II, Effects of hypophysectomy on the upper rat incisor following progressively longer intervals. Jnl. Dent. Res., 33:91-103 (1954).
11. Baume, L. J., and Becks, H.: Hormonal control of tooth eruption. The effect of thyroidectomy on the upper rat incisor—Response of growth hormone, thyroxin or combination of both. Jnl. Dent Res. 33:80-90 (1954).
12. Becks, H.: Personal Communication.
13. De Eds, F.: Persona! Communication.

INGESTION PRE- E POSTNATAL DE FLUORUROS — DECE-QUATRO ANNOS DE INVESTIGATION

Reporto Final
Dr. chir, dent. Reuben Feltman, George Kosel (B.S., M.S.)

SUMMARIO IN INTERLINGUA

In previe publicationes datos esseva presentate que demonstrava que le ingestion de fluoruros durante le stadios formative del amelogenese ha de facto un effecto in le disveloppamento del dentation, que le elemento es retenite in le sanguine e certe typos de tissu molle, e que un micre procentage de subjectos manifesta adverse reactiones systemic. Le datos colligite in le presente reporto confirma e extende ill constatationes, nunc a base de un plus extense numero de subjectos.

Premesurate doses de sales a contento de fluoruro esseva ingerite per gravidas e per lor prole usque al fin del octave anno de vita o durante le periodo del ameloformation dental. Le subjectos includite in iste studio esseva seligite sin principio particular. Le subjectos de controlo esseva prendite aleatorimente ab gruppos recipiente nulle cognoscite fluoruro supplemental. Le aqua natural in le area in que le studio esseva executate es libere de fluoruro.

Es presentate datos que demonstra que le fluoruro ingerite per gravidas es thesaurisate in le placenta ubi illo arriva via le circulation materne e ab ubi illo progrede a transverso le barriera placental pro entrar in le provision de sanguine del feto. Altere datos hic presentate indica que le fluoruro in le provision de sanguine del feto affice le disveloppamento dental e rende le dentes plus resistente contra carie dental. Nulle effectos inusual esseva notate in le formula hematologic del juvenes qui habeva ingerite fluoruros.

In un pro cento de nostre casos, signos de adverse effectos secundari del therapia de fluoruro esseva constatate. Es signalate que si un individuo es adversemente afficite per le fluoruro, le methodo empleate per nos permitte prestemente le elimination del allergeno o del intoxicante ab le dieta per suspender le supplemento dietari.

Benefic resultatos in le dentation es demonstrate. Fluorosis dental ha occurrite e poteva esser eliminate per le adjustation del doage usate. Fluoruros ingerite durante le prime e le secunde trimestre del pregnantia produce beneficios reflectite subsequentemente en le incidentia de carie dental. Nulle tal beneficios esseva notate post le ingestion de fluoruro durante le tertie trimestre.

Le modo de action de fluoruro non es cognoscite.

Il occurre un retardo in le eruption del dentes.

Es signalate que multe studios additional es requirite con respecto al effectos biologic del ingerite fluoruro.

* * *

NUTRITION AND ORAL HEALTH

The Otomi Indians eat grasshoppers and worms, Andes Indians like roasted ants, some Chinese communities include decayed eggs in their diet, and the Ecuadorians make a meal of guinea pigs.

Such "strange foods" are not necessarily inferior, though it is natural for people in this country to react unfavorably to them, Dr. Robert S. Harris, professor of food science and technology at the Massachusetts Institute of Technology, recently told a gathering of physicians, dentists and public health officials at the University of Pennsylvania School of Dentistry, Philadelphia.

The all-day interdisciplinary symposium on "Nutrition and Oral Health" was sponsored by the Committee on Nutrition and Metabolism of the Philadelphia County Medical Society, the National Vitamin Foundation, and the New York, Philadelphia and Pittsburgh sections of the international Association for Dental Research.

Man tends to like what is familiar to him, those foods to which geography and his culture have accustomed him, Dr. Harris pointed out in his talk on "Influences of Culture on Man's Diet." Sometimes, he added, foods from other cultures which we consider "strange" actually have high nutritional value.

Drawing partly on observations he and his associates made during a clinical and nutritional study of Otomi Indians in Mexico, Dr. Harris stated that Latin American plant foods often are more nutritious than those grown in the United States.

"In his eagerness to produce more kernels per row, more rows per ear, and more ears per stalk, the U. S. plant breeder frequently sacrifices nutrient content. In his desire to produce lovelier apples, sweeter oranges, blander vegetables, shipment-resistant foods, he has often produced varieties which are less nutritious per pound."

It is usually possible, the speaker added, to obtain all the desirable effects in plant breeding without adversely affecting nutrition, if the plant breeder will "add the nutritional factor to his working equation."

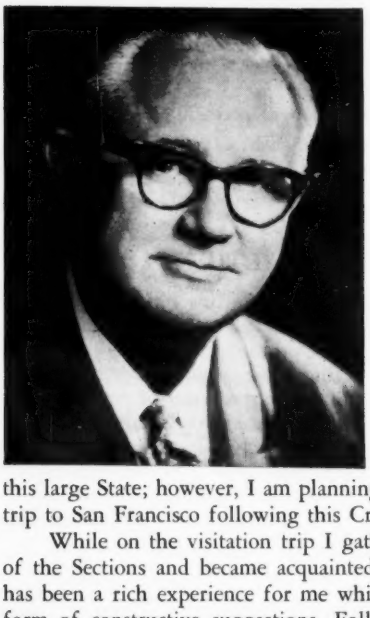
Another of the symposium's eight speakers, Dr. Albert Schatz, chief of the division of microbiology, Philadelphia General Hospital, and associate in medicine, University of Pennsylvania Graduate School of Medicine, presented a paper on "Soil, Water, Food, and Teeth."

As an example of the importance of nutrition, Dr. Schatz pointed to the extinct giant sloth (*Neomylodon Listai* Ameghino). The extinction of this species on a global basis, he said, was due to dietary deficiency, most probably involving trace metals.

"Nutrition begins with the soil, from which our food is derived," Dr. Schatz stated. "The soil also determines to a large extent the mineral content of the water we drink." The speaker discussed the role of minerals, trace elements, and vitamins in determining the quality and resistance to decay of the tooth's enamel.

RETIRING PRESIDENT'S MESSAGE

HERMANN BECKS, M.D., D.D.S.



Fellow Members of the Academy, Ladies, and Guests:

Traditionally, the Presidential address is short and cheerful—not gloomy. It is in this vein that I shall report the experience I have gained during my term as your president, which encourages me to say that, on the whole, the Academy is on the up-grade. During this last year I have expressed at various occasions certain pessimism with regard to our slow progress, but my Section Visitations cleared many of these areas that appeared to me to be most important to a successful future of the Academy. With the exception of Texas, I visited all eleven Sections over a period of six weeks. As you know, the Texas Section membership is relatively small and widely scattered over this large State; however, I am planning to visit with some of the members on my return trip to San Francisco following this Cruise Convention.

While on the visitation trip I gathered invaluable information about the operation of the Sections and became acquainted with individual members of each Section. This has been a rich experience for me which I would like to return to the Academy in the form of constructive suggestions. Following each meeting (sometimes until late after midnight) I summarized my impressions, and would like to mention at this time several aspects which the Academy may possibly wish to consider as a "Twenty-one Point Program" to future progress:

1) Section Visitations should be made an annual official function of the National President in order to create a better understanding and good will between National Headquarters and Sections and their individual members, and also to stimulate their activities for the welfare and progress of the Academy.

2) In the future, the NATIONAL MEETINGS should be directed from NATIONAL HEADQUARTERS by NATIONAL OFFICERS and *not* by Sections. The impression is left in the minds of many that National Headquarters tries to shift the responsibility for the National Meetings to the Sections. There are, of course, several Sections that have excellent scientific programs during the year, but there are others with little experience in this direction. One failure on the part of a Section to provide a good faculty for the National Meeting might ultimately result in reduced future attendance. I firmly believe that the responsibility for the *National* Meetings should be in the hands of *National* Officers.

3) At several occasions it was stated that the Mid-Annual Meeting in December should be abandoned (because of small attendance) and possibly converted into an annual NEW YORK SECTION meeting. This problem should be carefully considered by the Planning Committee and the Board of Trustees. *One* "excellent" National Meeting is better than two "good" ones.

4) A definite policy should be established to pay reasonable honorariums to obtain for this ANNUAL MEETING the *best* faculty talent available in the field of DENTAL MEDICINE.

a. In order to defray these honorariums, it will be necessary to establish a tuition from year to year which is adequate to secure such talent.

b. Point 4a applies, of course, only to those who attend the meeting. The *annual dues*, should *not* be raised. However, those who avail themselves of an excellent scientific meeting should pay for it.

5) Required Section meetings should be reduced to ONE (according to the By-laws THREE are now required). If each Section has one *good* meeting a year, this should be satisfactory, provided there is an excellent faculty and the Section members make a special effort to be present.

6) The name "Section" should be replaced by "STATE CHAPTERS OF THE AMERICAN ACADEMY OF DENTAL MEDICINE." This may appear minor to many of you, but I heard this mentioned more than once throughout the Section Visitation trip.

7) Twenty per cent of the annual dues *should* be returned to the Sections, but *only* for those members who attend the National Meeting and one SECTION MEETING for the year.

8) The time, or date, of the NATIONAL MEETING should be reevaluated as there was much comment that the meeting in May is unsuitable for most University people because of final examinations at that time, or for "other reasons."

9) The "retreat" form of meeting, as it has proved so successful in Berkeshire, Sky Top, Colorado Springs, the Northwest, Midwest, and Palm Springs, should be followed through, or at least *attempted*.

10) The requirement that no member can be elected to a National office without having served a minimum of three years on the Board of Trustees has been violated repeatedly in the past. It seems pertinent to remove it from the By-laws. A person should be evaluated by his personal performance in the Academy and/or his proven professional administrative ability. I would suggest that this be explored by the Constitution Committee.

11) I heard the question often discussed that a DEFINITE REQUIREMENT should be set for ATTENDANCE at National *and* Section meetings. The Board of Trustees and Planning Committee should give this unbiased and thorough consideration.

12) A (non-academic) secretary should be hired (probably on a part time basis) with an official headquarters office and *permanent mailing address wherever the National Secretary is located*.

13) During the last year I found that committee chairmen and Section Officers were not informed as to their expected duties and responsibilities. A suggestion was made that possibly a "training course" for committee chairmen, delegates, and Section chairmen be given annually by experienced former officers of the Academy.

14) The Constitution Committee should carefully spell out the WORKING MECHANISM of each committee from year to year for whatever changes may become necessary to meet the CURRENT needs.

15) The Constitution Committee should consistently reevaluate the Constitution and By-laws so that *they meet the needs of the Academy at all times*.

16) The National officers *and* the chairmen of the various Constitutional Com-

mittees should be appointed for a minimum of *two* years to assure continuity of working procedures.

17) The Texas and Ohio charters should be revoked because of inactivity. However, they can be reinstated if and when they meet the Constitutional requirements.

18) I would suggest that the Section Delegates present the wishes of their Sections *regularly* to the National Secretary for distribution before each Planning Committee meeting.

19) At the last Board of Trustees meeting it was agreed that the Board of Oral Medicine be reactivated at an early date. It was felt that the ADA would look with favor upon this area of specialization. On the other hand, I have received somewhat pessimistic reports relative to an early solution to this problem. Present consideration should be given to the development of a CERTIFICATION PROGRAM within the Academy and to examinations for Certification status. If and when the Specialty Board is finally approved, the Certificatees can then be declared Diplomates.

20) Since my term in office expires with this meeting, I would like to urge the President-elect to appoint a PUBLICITY COMMITTEE and NEWS LETTER EDITOR at the earliest possible moment.

21) I regret very much that the Journal editor has found it necessary to leave his post at the end of this term. A few weeks ago I made my recommendations to the Nominaitng Committee and will be happy to give any counsel that may be required in this respect in the future.

May I ask President-elect, Dr. Goldstein, to appoint a committee to examine this Twenty-one Point Program and report back to the Board of Trustees at the last meeting, June 2nd, aboard this beautiful ship.

As most of you probably know, the Nominating Committee has graciously honored me with a proposed second term as your president. Unfortunately, my professional obligations and academic work will not permit my acceptance. I have so informed the Nominating Committee and the Advisory Council in my letter of April 12, 1961. The president's job requires *full time* attention to detail in *administrative matters* and the *scientific programs* in an organization of this type. Even though we have made good progress during this last year, I must leave the future of the Academy in the hands of those who will follow.

In closing, may I take this opportunity to thank my congenial co-worker, George Clarke, for his wonderful cooperation and the spirit with which he fulfilled his difficult task as National Secretary. My sincere thanks, of course, go also to Will Greenhut, our most "valuable" Treasurer, and, last but not least, to all Committee Chairmen, Board of Trustees and members of advisory council and Section Officers, who have given so generously of their time.

There is one more important conclusion, however, namely, that I hope you will all come to visit me in California—provided you don't all come at the same time!

I leave this office with a good feeling; I have tried to contribute something constructive to the Academy and hope that progress will continue from year to year.

Thank you.

PRESIDENT'S ADDRESS

ABRAHAM GOLDSTEIN, B.S., D.D.S., F.A.C.D., F.A.D.M.

Fellow Members, Ladies and Gentlemen:

There are many events in our lives that are outstanding, but only a few are of special signifiance. In accepting the office of President of the American Academy of Dental Medicine, a great event in my life takes place.

It has been a privilege and pleasure to be a member of our organization from its inception and to have participated in its growth and development. I am ever mindful of the hopes and ideals of the late Samuel Charles Miller for the future of the Academy and I am sure that we can fulfill his plans.

I know that my work as President will be greatly simplified by the tremendous amount of groundwork done by our retiring President. I wish to thank Dr. Becks for his wonderful and fruitful labors on behalf of the Academy.

I accept the office of President with pride and humility and with a full appreciation of your confidence in electing me to this position. Together with our excellent staff of officers and committeemen, I shall endeavor to achieve the high standards attained by the work of our past Presidents.

Plans for the coming year include:

1. Continuation of Section visitations by the President to maintain a close relationship and understanding between national headquarters and sections.

2. National meeting programs to be directed and supervised by the National Scientific Sessions Committee.

3. A thorough investigation into the "retreat" type of meeting as to its feasibility and desirability. A questionnaire has been circulated to determine the best date for the Annual meeting.

4. Full use of the "Newsletter" to keep the membership informed of "up to the minute" news and views.

Full attendance at Section, Mid-annual and Annual meetings is a necessity for the most proficient functioning of the Academy.

Let me thank you for your good wishes and let us work in harmony for the growth and betterment of the Academy.

Thank you.

Academy Proceedings

AMERICAN ACADEMY OF DENTAL MEDICINE ANNOUNCES MID-ANNUAL MEETING

The sixteenth mid-annual meeting of the American Academy of Dental Medicine will be held on Sunday, December 3, 1961 at the Park-Sheraton Hotel on Seventh Avenue at West 55th and 56th Streets in New York City. The format of the meeting has been expanded to a full day in order to provide more time for scientific sessions. The program is as follows:

9:00 A.M. TO 11:00 A.M. MORNING SYMPOSIUM

"MODALITIES OF ULTRASONICS AS ADJUNCTS IN DENTISTRY"

MODERATOR: Sidney Sorrin, D.D.S., F.A.C.D., F.A.D.M.
Professor and Chairman, Department of Periodontia and Oral Medicine, New York University College of Dentistry; Periodontist, Montefiore Hospital; Consultant in Periodontia, Veterans Administration; Author, "Practice of Periodontia"; Diplomate, American Board of Periodontia.

ESSAYISTS:

Benjamin S. Recant, B.A., D.D.S.
Chief of Oral Surgery, Astoria General Hospital; Associate Attending, Elmhurst General, Booth Memorial, St. Johns Hospitals; Diplomate, American Board of Oral Surgery.
"THE USE OF ULTRASOUND IN THE TREATMENT OF NERVE AND MUSCLE INJURY."

Harold K. Addelston, D.D.S., F.A.C.D., F.A.A.A.S.
Professor and Chairman, Department of Pedodontics, New York University College of Dentistry; Attending, Pediatric Dentistry, Polyclinic Hospital.
"THE APPLICATION OF ULTRASONICS IN OPERATIVE DENTISTRY AND PEDODONTICS."

Sol J. Ewen, B.S., D.D.S.
Section Head, Periodontia, Long Island Jewish Hospital; Instructor, Department of Periodontia and Oral Medicine, New York University College of Dentistry; Research Fellow, Guggenheim Institute for Dental Research; Diplomate, American Board of Periodontia.
"THE ROLE OF ULTRASONICS IN PERIODONTAL THERAPY."

Frederic M. Chacker, A.B., D.D.S.
Instructor, Oral Medicine, University of Pennsylvania School of Dentistry; Instructor, Periodontology, University of Pennsylvania Graduate School of Medicine.
"THE HISTOLOGIC EFFECTS OF ULTRASONIC THERAPY."

11:00 A.M. TO 12:30 P.M. BUSINESS MEETING

1:00 P.M. TO 5:00 P.M. LUNCHEON AND AFTERNOON SESSION. The afternoon symposium will be devoted to Nutrition.

ESSAYISTS:

Samuel Dreizen, B.A., D.D.S., M.D.
Associate Professor of Nutrition and Metabolism, Northwestern University Medical School; Former Assistant Scientific Director, Nutrition Clinic, Hillman Hospital, Birmingham, Alabama.

"NUTRITION AND ORAL MEDICINE."

Abraham E. Nizel, D.M.D., M.S.D.
Assistant Clinical Professor, Preventive Dentistry, Tufts University School of Dental Medicine; Research Associate In Nutrition, Massachusetts Institute of Technology.

"A STEP BY STEP PROCEDURE FOR CARIES PREVENTION AND CONTROL THROUGH NUTRITIONAL COUNSELING."

The fee for registration and luncheon is $10.00. Please send checks to Dr. Rudolph Palermo, 111 Larch Drive, New Hyde Park, L. I., New York. The speakers have been selected for their informative and dynamic deliveries. This will be one of the most stimulating meetings the Academy has ever had. Everyone should attend.

HENRY I. GREENE, *Program Chairman*

AMERICAN ACADEMY OF DENTAL MEDICINE
CORRECTED LIST OF NEW MEMBERS ELECTED MAY 30, 1961

Albert, Maynard L.
Salem, Massachusetts

Blaine, Edward E.
Memphis, Tennessee

Block, Philip L.
Baltimore, Maryland

Da Silva, Sebastiao F.
Rio de Janeiro, Brazil

Fenech, Louis J.
Windsor, Canada

Goldberg, I. Lawrence
Avenel, New Jersey

Graham, Richard M.
Traverse City, Michigan

Hayes, Cletus J.
Detroit, Michigan

Hempstead, Edward J.
St. Louis, Missouri

Hoffman, Edward
Baltimore, Maryland

Hudis, M. Mac
Bronx, New York

Kemper, Walter W., Jr.
Indianapolis, Indiana

Kniaz, Avrom
Milwaukee, Wisconsin

Labattaglia, William
Brooklyn, New York

Lantz, Harold J.
Wynnewood, Pennsylvania

Law, Albert D.
Detroit, Michigan

Lobene, Ralph R.
Boston, Massachusetts

Marcus, Richard W.
Plainfield, New Jersey

Masters, Donald H.
San Antonio, Texas

Melamed, Myron A.
Binghamton, New York

Melser, Alvin W.
Red Bank, New Jersey

Mendel, Berl L.
Montreal, Canada

Mendoza-Tio, Carlos F.
Mayaguez, Puerto Rico

Osleeb, Stuart S.
Long Branch, New Jersey

Ostaski, William M.
Lynn, Massachusetts

Ringsdorf, W. Marshall
Birmingham, Alabama

Riteris, Tamara E.
Milwaukee, Wisconsin

Ruff, Joseph T.
Colonia, New Jersey

Staub, Daniel M.
Belle Harbor, New York

Strobach, Karl F.
Clayton, Missouri

Tannen, Richard H.
Albany, New York

Vella, Ross J.
Syracuse, New York

Wrubel, George J.
Staten Island, New York

American Academy of Dental Medicine Cruise

Dr. Don C. Lyons (left), presenting the Academy of Dental Medicine Fellowship to Dr. Samuel Turkenkopf as Drs. Hermann Becks and Howard Ward look on.

Dr. Abraham Goldstein, [illegible]nted Presid
is introduced by Past [illegible] Dr. Her

Dr. Howard Ward presents "Certificates of Appreciation" to the 1961 Cruise Convention Committee. (L. to R.) Drs. Abraham Goldstein, Seymour Koteen, Abe Reiner, Rudy Palermo, Al DeVanna, Angelo Cacciatore, Howard Ward.

Dr. Hermann Becks be[illegible]nted with t
dent's [illegible] Ward.

ine Cruise Convention — May 26-June 3, 1961

oldstein, ted President, (right), by Past Dr. Hermann Becks.

Dr. Don C. Lyons installing the 1961-2 officers. (L. to R.) Drs. Don Lyons; Walter Levine, Vice-President; Gunter Schmidt, President-Elect; Abraham Goldstein, President; Hermann Becks, Past-President; George Clarke, Secretary. Dr. William Greenhut, Treasurer and Dr. Alexander Soberman, Editor are not in this photograph.

Becks ted with the Past-President's Ward.

Hostesses of the Cruise Convention: (L. to R.), Mrs. Rudy Palermo, Mrs. Seymour Koteen, Mrs. Howard Ward, Mrs. Abe Reiner, Mrs. Abraham Goldstein, Mrs. Al DeVanna, Mrs. Angelo Cacciatore.

1961 CRUISE CONVENTION CHAIRMAN'S REPORT

On bleak Friday, May 26th—an 11:15 A.M. phone call informed me that the A.A.D.M. Cruise Convention ship, The Ocean Monarch, would not sail as scheduled. Inconceivably, I listened to a tale about a "conked out" motor which caused the ship to limp into port that morning. The ship would not be permitted to sail until repairs had been completed. Repairs would take 4 to 6 days.

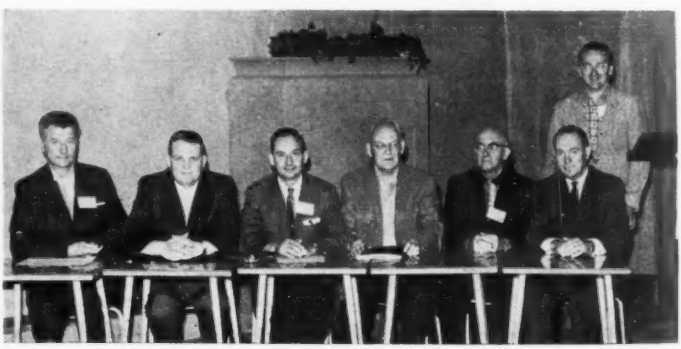
Recovering from the "blow," I hastily relayed the problem to Dr. Becks and then set out for the pier. The task was clear; new arrangements had to be made to accommodate the Academy members. The S.S. Nassau, a trim ship leaving for Nassau that evening, was selected. Fortunately, a sufficient number of accommodations were available and one by one our members were transferred. After having accomplished this herculean task, amidst a torrential storm, we found ourselves aboard ship still in need of arranging for facilities for our scientific programs and social events. With the aid of the Chief Purser, these problems were soon solved—as publicity, scheduling, and space were most graciously made available for us. The entire staff of the ship did everything possible to aid us in our situation. Similarly, our members gave more of themselves in spirit and camaraderie to make this convention an outstanding succcess.

We wired our regrets to the Bermuda Dental Society, and followed up with a letter of explanation. Our members received their complimentary Furness Sea Bags, as welcoming gifts, which had been filled with an assortment of useful, personal items and drugs, offered through the courtesy of many generous companies.

Despite many distractions aboard ship, our lectures were very well attended.

Dr. Hermann Becks gave two excellent dissertations on "Oral Lesions of Systemic Origin." Dr. James Lee clearly and interestingly defined "Industries' Role in the Development of a Local Anesthetic." Dr. Leslie Milne gave a comprehensive lecture on "Pemphigus" and its ramifications. The Michigan Section's participants were Drs. Malcolm D. Campbell, Charles M. Conat, Herman M. Lifton, Meyer E. Green, Roger Lyons, Richard M. Christl, and Dr. Don C. Lyons as moderator. They presented a stimulating symposia on "The Dento-Medical Changes of the Gravid Patient."

Dr. Milton Hyman ably contributed a "Simple Approach to the Treatment of Temporo-Mandibular Joint Dysfunctions."



Symposium participants: The Michigan Section, (L. to R.), Drs. R. Christl, R. Lyons, M. Green, D. Lyons — moderator, C. Conat, M. Campbell. Standing, Dr. Abe Reiner, Symposium Chairman.

Dr. Ward (right) presenting Certificates of Appreciation to the essayists, (L. to R.), Dr. James Lee, Dr. Hermann Becks, Dr. Milton Hyman.

The entire scientific program was tendered sincerely, in an attempt to offer our members new information. All our lecturers were received most enthusiastically and were presented with Certificates of Appreciation from the Academy for their efforts in contributing to the scientific program.

The Cruise Convention Committee aboard ship must be commended for an outstanding job. They were: Drs. Abe Reiner, Rudy Palermo, Al DeVanna, Angelo Cacciatore, and Seymour Koteen. Each man had the opportunity of chairing a scientific session. They did their job with dignity and dispatch. The Academy awarded a Certificate of Appreciation to each of these men for their efforts, which was followed by a post-convention letter of thanks from your chairman.

Members of the committee who functioned on shore and were unfortunately unable to attend, were: Drs. Henry Greene, Leonard Nevins and Arthur and Steven Nachbar. I wish to personally extend my sincere thanks to them for their cooperation.

The wives of the committee did a wonderful job as hostesses and the ladies who attended the convention had a fine time. They were: Mesdames Howard L. Ward, Abe Goldstein, Abe Reiner, Al DeVanna, Angelo Cacciatore, Seymour Koteen and Hermann Becks.

A special vote of thanks goes to Dr. Leslie Milne who aided the committee as Academy Photographer.

The Academy acknowledged receipt of a donation by the Ladies of the Michigan Section—to The S. Charles Miller Memorial Fund. These funds were raised at a card party—hostessed by the Michigan Section Ladies Auxiliary.

Dr. and Mrs. Becks, Captain Roberto Mantero and Chief Purser Gianmarco Viscontini (L. to R.), at the Captain's Cocktail Party.

"Honor Night" and "Award and Installation Night" were conducted with dignity and decorum. Dr. Sam Turkenkopf was the recipient of a fellowship presented by Dr. Don Lyons. Dr. Ward presented the Past President's Key to Dr. Becks.

Your chairman was presented with a Certificate of Merit by Dr. Becks, after which the members of the Academy spontaneously extended a standing ovation.

Dr. Don Lyons—introduced and inducted our incoming officers: Dr. Abe Goldstein, President; Dr. Gunter Schmidt, Pres. Elect; Dr. Walter Levine, Vice President; Dr. George Clarke, Secretary; Dr. William Greenhut, Treasurer. Dr. Hermann Becks then turned the gavel over to Dr. Abe Goldstein.

In true oratorical fashion, Dr. George Clarke made the presentation of the Past President Plaque to Dr. Becks, who humbly accepted it and pledged his future support.

Your chairman, with a feeling of gratification, closed the 15th Annual A.A.D.M. Convention anticipating our December Meeting in New York and our National Convention in Baltimore in May, 1962.

Post Convention Note: "Skipping" Bermuda was indeed a lucky twist of fate. Later information revealed that heavy storms in Bermuda sorely distressed those arriving on our anticipated arrival date. On the S.S. Nassau, we merely felt the terminus of the brunt of the storm. It was unanimously agreed by all those in attendance that this was one of the most successful and enjoyable conventions ever held.

A note of thanks was sent to the Incres Line by our Secretary, Dr. George Clarke, acknowledging the fine service and cooperation shown to the Academy.

HOWARD L. WARD, *Cruise Convention Chairman*

Board of Trustees relaxing on ship-board. (L. to R.) Drs. Don Lyons, Abraham Goldstein, Hermann Becks, Walter Levine, Gunter Schmidt, George Clarke, David Willer, Samuel Turkenkopf, Charles Conat, Howard Ward.

HEALTH AND PHYSICAL FITNESS TESTS OF DENTISTS* (WITH IMPLICATIONS)

THOMAS KIRK CURETON, PH.D., F.A.P.H.A.

With the cooperation of

WILLIAM H. HIATT, D.D.S., Denver, Colorado; F. A. PIERSON, D.D.S., Lincoln, Nebraska; BERYL RITCHIE, D.D.S., Colorado Springs, Colo. ISAAC SCHOUR, D.D.S., Chicago, Illinois

VARIOUS STUDIES ON THE HEALTH OF DENTISTS

How Healthy are Dentists? Several groups of dentists have recently turned the spotlight on their own health and fitness in an intelligent effort to discover how to live better with their profession.

In July, 1946 a questionnaire survey was made by Florence E. Biller[1] of 2400 dentists on "Occupational Hazards of Dental Practice," and almost 100 per cent believed that dental practice caused certain occupational diseases such as *eye strain, postural defects, circulatory ptosis* and *rheumatic conditions.*

The questionnaire results of this first study summarized by Biller are shown in Table I:

TABLE I—OCCUPATIONAL DISORDERS BELIEVED BY DENTISTS TO BE ASSOCIATED WITH THEIR PROFESSION
(Biller, 1946)
N = 2400

Ailment	*Per Cent Believed Associated*
Eye Strain	87.6%
Postural Defects	77.9%
Varicose Veins and other neuro-circulatory ailments	66.7%
Low Back Pain	65.7%
Flat feet	60.1%
Nervous disease	56.1%
Upper respiratory infection	46.5%
Heart disease	41.0%
Skin Allergies	38.9%
Chronic constipation	38.4%
Ulcers	37.8%
Lung diseases	22.2%
Arthritis	21.6%

Two other studies are summarized in Table II, indicating fairly high percentages of deterioration along with tension and anxiety disorders: Gastrointestinal (25.6%), Anxiety (18.7%), Cardiovascular (16.5%), Rheumatic (11.4%). These results, published by Austin and Kruger[2] in 1947, were from data obtained at the Mayo Clinic on 273 dentists examined there in 1940.

Bernstein and Balk's[2] report from Newark, N. J., on morbidity of dentists shows that dentistry has certain associated "occupational" illnesses and chronic disorders which may suggest, on the basis of a study of 56 dentists, that dentistry may be an unhealthy profession. In 1953, Bernstein and Balk[3] could locate only two other studies made of the health of dentists.

Very little agreement was found between the Mayo Clinic report and the Newark group report, as the following Table II shows:

TABLE II—AILMENTS AND DISEASES OF DENTISTS

Ailments or Diseases	*Mayo Clinic (1947) N = 273*	*Newark Group (1953) N = 56*
Anxiety (Exhaustion)	18.7%	42.1%
Gastrointestinal	25.6%	35.7%
Rheumatic	11.4%	25.0%
Cardiovascular	16.5%	30.5%
Other	5.9%	1.7%

However, these two groups were not equal as to city and rural representation, nor are the percentages based on an equal base (number of cases). In spite of this the rank order may be of some significance, showing more anxiety,

* Read before the 16th Annual Meeting of the American Institute of Oral Biology, Palm Springs, California, November 1959.
† University of Illinois, Urbana.

cardiovascular, and gastrointestinal trouble in the crowded industralized area of Newark, compared to the mid-west sample at Mayo's.

RESULT OF OBJECTIVE PHYSICAL FITNESS TESTS OF DENTISTS

Physical Fitness Tests for Dentists. In connection with Physical Fitness Clinics, sponsored by dentists and conducted technically by the writer, in Denver, Bailey's Harbor, Wisconsin, (Mid-West Dental Seminar), Colorado Springs, and Lincoln, Nebraska, data are available on some 100 dentists who took tests and gave information about themselves in private interviews during 1957, 1958, and 1959. The health questionnaires, activity records, and tests are the same as those used in the Physical Fitness Research Laboratory, University of Illinois, Urbana.[4, 5, 6]

From the *activity participation questionnaire* given in the Physical Fitness Clinics it was shown that the dentists studied do not exercise enough to prevent progressive deterioration (shrinkage) of connective tissue, capillaries, muscles, respiratory volume, or circulation in general.

This group averages 44.5 years of age; is 69.76 inches tall; and is 172.6 pounds in weight.

In the physical ability tests (motor tests) 37.2% could not step up and down for 5 minutes on the 17 inch chair; 36.4% could not jump 15 inches or over in the vertical jump; 83.4% could not complete the 700 endurance hops; 80% could not pass the 18 item motor test with 13 items as passing; 85.7% made less than 50% on the balance beam test.

Results from the objective physical fitness tests show several interesting types of results, Table III.

Summary of the fitness tests on 100 dentists gives the following:

Below Average in:	*Average in:*	*Above Average in:*
Systolic Blood Pressure (13SS)	Decrement in P.W. (Sitting to Standing)	(Nothing at all)
Diastolic B.P. (—19SS)		
Pulse Pressure (—4SS)		
Area Brachial P.W. (—14SS)		
Systolic Amplitude Brachial P. S. (—17SS)	Breath Holding After 1′ Exercise (50SS)	
Angle of Ejection, B.P.W. (—26.5SS)	Trunk Extension Backward (50SS)	
Diastolic Surge (—22SS)	Chest Girth Expanded—Abdominal Girth (50SS)	
Amplitude of B.P.W. After 1′ Run (—14SS)	Fat (+3SS)	
Trunk Flexion Forward (—16SS)	Chest Expansion (50SS)	
	Terminal Pulse Rate after 5′ Step Test Ex. (50SS)	
Right Hand Grip (—17SS)		
Left Hand Grip (—18SS)		
Back Strength (—3SS)		
Leg Strength (—2SS)		
Total Strength (—6SS)		
5′ Step Test (—2SS)		
Drop in Dias. B. P. After Ex. (—12SS)		
Sys. B. P. After 5′ Ex. (—9SS)		

TABLE III—RESULTS OF OBJECTIVE PHYSICAL FITNESS TESTS OF DENTISTS

	Units	*Range*	*Mean*	*S.S.*
1. *Quiet Sitting Blood Pressures*	mm.Hg.			
Systolic Blood Pressure		105–190	131	37
Diastolic Blood Pressure		60–122	84.1	31
Pulse Pressure		14–97	46.5	46
2. *Quiet Sitting Brachial Pulse Waves* (Sphygmograms, indicating Stroke Volume of Heart by Heartograms)				
Pulse rate, sitting	Bts./Min.	51-128	78.1	51
Area (by planimeter)	Sq. Cm.	0.10—0.50	0.272	36
Systolic Amplitude, Sitting	Cms.	0.63—1.56	1.01	33
Systolic Amplitude, Standing	Cms.	0.22—1.40	0.71	52
Diastolic Surge, Sitting	Cms.	0 to 0.53	0.007	28
Angle of Ejection, Sitting	Degs.	9.0 to 52°	18.0°	23.5
Amplitude After 1 Min. Run in Place at 180 Steps/Min.	Cms.	0.30 to 2.22	1.05	36
3. *Vital Capacity and Breath Holding*				
Vital Capacity Residual	Cu.Ins.	82 to —117	—32.3	42
Breath Holding After 1' Step Test, 30/Min.	Cu.Ins.	6 to 46	16.4	49
4. *Flexibility of the Chest and Spine*				
Trunk Extension Backward	Ins.	5.8-22.4	14.4	50
Trunk Flexion Forward	Ins.	24—7.8	14.6	34
Chest Expansion	Ins.	1.7—5.1	3.24	50
5. *Metropolitan Life Ins. Co. Index*				
Fat (by calipers over skin folds)	mm.	60-197	129.1	54
Exp. Chest Girth—Normal Abdominal Girth	Ins.	—3.0 to 8.6	4.15	50
6. *Strength* (by Dynamometers)				
Right Hand Grip	Lbs.	52-140	97.6	33
Left Hand Grip	Lbs.	52-126	87.8	32
Back Strength	Lbs.	150-500	337.4	47
Leg Strength	Lbs.	270-600	431.7	48
Total Strength	Lbs.	588-1215	950.6	44
Strength/Weight	Lbs.	4.1-7.8	5.52	38
7. *Cardiovascular Adjustments to Exercise*				
Terminal Pulse Rate	Beats/Min.	138-192	169.6	50
5 Min. Step Test	Counts	138-213	178.1	48
Sytolic Blood Pressure After 5 Min. Step Test	mm.Hg.	100-227	154.3	48
Diastolic Blood Pressure After 5 Min. Step Test	mm.Hg.			
Drop in Diastolic Blood Pressure after Exercise	mm.Hg.	—28 to 22	—1.4	38

The pattern which evolves from this is 1) Trend toward higher sitting Diastolic Blood Pressures, 2) Poor Stroke Volume of the Heart (by Pulse Waves), 3) Depressed (Anxiety) Sphygmograms, 4) Sluggish Heart Action (by Wide Angle of Ejection and lack of Diastolic Surge), and Slow Filling of the Heart, 5) Poor Trunk Flexion Forward, 6) Low Strength, 7) Poor Adjustment to Hard Exercise (5' Step Test).

Average response was obtained in 1) Circulatory Ptosis (Sitting to Stg. P. W. Decrement), 2) Breath Holding After 1′ Exercise, 3) Trunk Extension Flexibility, 4) Chest-Abd. Girth, 5) Terminal Pulse Rate After Exercise, 6) Fat.

In this sample no single item averaged as much as 5 S.S. above average by comparison with the adult fitness tables.

TYPICAL CHANGES DUE TO PHYSICAL EXERCISE

Wm. H. Hiatt (Denver), improved over 8 months on a program of walking home plus treadmill climbing or swimming 30 minutes per day: Weight (gained 3 lb. from 158 to 161 lbs., 2 S.S.%); fat gained (from 48 to 51 mm. or 1 S.S.%); chest expansion gained from 3.5 to 3.7 Ins. or 4 S.S.%; Chest-abdominal girth gained from 7.2 to 9.0, or 6 S.S.%; lost in dynamometer strength from 1181 to 1096 lbs. (6 S.S.%); gained in 5′ Harvard Step Test 215 to 165 beats (36 S.S.%); breath holding remained the same (did not smoke); systolic blood pressure reduced from 137 to 126 mm. Hg. (16 S.S.%); diastolic blood pressure rose from 65 to 70 mm. Hg. (−7% S.S.); pulse pressure reduced from 72 to 56 mm. Hg. (18 S.S.%); diastolic blood pressure after 5′ Step Test reduced from 70 to 55 mm. Hg. (15 S.S.%); change in post-exercise diastolic blood pressure dropped from +5 mm. Hg. to −15 mm. Hg. (−20 S.S.); area of brachial sphygmogram improved from 0.10 to 0.19 (11 S.S.%); obliquity angle of heartograph improved from 30° to 20° (45 S.S.%); amplitude of spygmograph improved from 0.41 to 0.97 cms. (or 30 S.S.%); and the amplitude of the heartograph after exercise improved from 0.19 to 1.42 cms. (49 S.S.%).

This dentist set out to improve his "very poor" circulatory records and deliberately neglected strength type work. To say that he improved is to put it mildly. His chronic ailments, especially fatigue, vanished after a year on his new training program. His friends noticed that his habitual stuttering was completely overcome. His color greatly improved. There was tremendous improvement in his swimming endurance, his post-exercise pulse waves, and his recuperation after exertion.

HEALTH HABITS OF DENTISTS TESTED IN FITNESS CLINICS

Results of several of the more important HEALTH HABITS are summarized and comments are made as to the implications. No adequate study of health habits has been found. In the four Physical Fitness Clinics for dentists the following data have come to light in our own work:

Amount of Exercise. The amount of exercise is probably the most important question. All studies show that improvement in physical fitness is related to the amount of participation.

TABLE IV—AMOUNT OF EXERCISE IN FRACTICING DENTISTS

Hours Per Week of Systematic Exercise for Fitness

f	*N*	*Per cent*
0	78	78%
1	4	4%
2	11	11%
3	5	5%
4	6	6%
5	2	2%
6	4	4%
	100	

The type of exercise done by dentists, according to their check lists and statements made in the interviews, is rather trivial. From our experience it takes from one to two hours per day to maintain physical fitness up to the average or above level (reasonably free from chronic ailments). With 78% doing less than 15 minutes per day (not counting standing and sitting in the office or walking casually to and from cars), the others are (in order of frequency): 1) walk to or from work, 2) swim, 3) perform home calisthenics, 4) play handball, 5) work their lawns or gardens, 6) run, 7) play tennis, 8) ride horses, 9) cycle, 10) farm, 11) walk the dog, 12) sail, 13) ski, 14)

wrestle, 15) take steam baths and massage.

Amount of Smoking. Various studies emphasize that smoking is a reflection of nervous tension. However, many dentists do not smoke, at least on the job, realizing that this habit intereferes with the efficiency of their work. It is also objectionable to many patients.

TABLE V—INCIDENCE OF SMOKING AMONG DENTISTS IN THE PHYSICAL FITNESS CLINICS

f	*No.*	*Per Cent*
0	60	61.9%
1–9	12	12.3%
10–19	3	3.1%
20–29	22	22.7%
	N = 97	

A majority of practicing dentists do not smoke.

Sigler[7] reported that tobacco is a contributing cause of degenerative coronary disease. A total of 1520 cases were investigated—1186 males and 334 females. Among the males 519 were non-smokers and 667 were smokers; among the females 292 were non-smokers and 42 were smokers. Clinical signs of coronary disease were shown among the males in 44.8% of the smokers and 29.2% of the non-smokers; and among the females 50.2% among the smokers and 19.1% of the non-smokers. The higher the amount of smoking the earlier was the onset of clinical signs of coronary disease. Also, the greater the smoking, the earlier the occurrence of coronary occlusion. The age at death was also younger in smokers than in non-smokers. In the male smokers 20.2% died before 50 years of age compared to 6.4% for non-smokers.

Aside from the probability of cancer, poor circulatory adjustments are present in most heavy smokers. Since 77.3% of the dentists tested showed poor circulatory fitness, this may be a contributing cause for about 40% who do smoke.

Fatigue and Nervous Tension. Fatigue, nervous tension, and poor circulatory adjustment are unquestionably related. Among the dentists in the Physical Fitness Clinics, 77.3% showed poor circulatory adjustments sitting or standing at rest, 21.1% adjusted poorly to 1 minute of exercise (a run in place, 180 steps/min.), 18.2% reported nervous tension, 14.3% reported chronic fatigue, 14.3% reported headaches and 15.1% reported shortness of breath. These results are shown in Table VI.

It is reflected in several studies that dentistry involves a financial strain to develop adequate equipment and an office in a good location. There is tension about payments to the bank, federal taxes, and desire for the newest and best equipment as other dentists have. There is also tension associated with the "on the clock" appointment system. Mental frustrations are bad for circulation.

But some of the fatigue and associated tension due to just feeling too tired to keep up is a reflection of deterioration. Dental work is confining, being carried out in small offices, some of which are poorly ventilated and frequently over-heated. Long hours are spent in close, tense work, much of it in poor postural positions in which circulation is restricted. Tension further constricts the blood vessels in the lungs, muscles, and heart tissue. The implication of such poor circulation is inevitably poor nutrition, which always hinges upon circulation and utilization of food, regardless of what is put in the mouth.

In a dentist who leans a bit off balance to the left there may usually develop a postural ache in the right hip. Continual tension in a muscle will cause it to ache because its circulation is partly cut off in continuously held static postures of this type. Stretching from time to time would help to restore circulation and relieve tension.

Nervous tension certainly inhibits the blood flow, as does inadequate breathing and the long-held vertical positions in which circulatory ptosis (accumulation of blood in feet and lower abdominal veins) is bound to develop unless there is a compensating program to keep the veins and muscles in good tone.

TABLE VI—INCIDENCE OF COMPLAINTS AND CHRONIC DISORDERS AMONG DENTISTS IN FITNESS CLINICS, 1955-59 (by Tests, Interviews, and Questionnaires)

Fitness Items	*By Observation or Test*	*By Interview or Questionnaire*
1. Circulatory Slugglishness (by Pulse Wave Dec.) Sit-Stg.	77.3%	
2. Abdomen Too Large for Chest (less than 4.0") (by tape meas.)	33.3%	
3. Poor Chest Expansion (less than 3-inches (by tape meas.)	27.5%	
4. Poor Circulatory Adjustment to Exercise (by Pulse Wave Dec.)	21.1%	
5. Joint Weakness or Aches, Pains, Stiffness		19.6%
6. Nervous Tension		18.2%
7. Overly Fat (over 139 mm.) (calipered skin folds)	15.1%	
8. Short of Breath After One Min. Exercise (less than 14 secs.) (by chair stepping, 30/Min.)	15.1%	
9. Chronic Fatigue (almost always)		14.3%
10. Headaches		14.3%
11. Eye Fatigue		14.3%
12. Varicose Veins	14.3%	
13. Kidney Trouble (medical diagnosis)	6.1%	
14. Gall Stones (medical diagnosis)	6.1%	
15. Gas Pains		4.6%
16. Previous Coronary (medical diagnosis)	4.6%	4.6%
17. Heart Thumping		3.1%
18. Cramps in Muscles		3.1%
19. Liver Trouble (medical diagnosis)		1.5%
20. Chest Pain		1.5%
21. Diabetes (medical diagnosis)		1.5%
22. Hay Fever		1.5%
23. Gout		

REVIEWS OF STUDIES—HARD WORK VS. SEDENTARY WORK

Studies of Physicians. Dentists may have a better health record than physicians but I would like to comment briefly on three studies of physicians because there is a certain occupational similarity in (1) Dealing continually with human subjects, (2) Working in small offices with a very limited amount of locomotion per day, (3) Fee system, (4) Danger of possible malpractice, (5) Appointments on the clock.

1. A study of 9396 American doctors in 1958 showed that the typical American doctor works 54 hours per week at his professional work, relaxes 7 hours per day (mostly at meals); then he takes a 2½ week vacation; he also ignores the need of his own medical or physical examination (⅕ took them in the last four years). The number one cause of death is heart disease (in 2700 deaths among physicians from July 1, 1957, to June 30, 1958, 50% of the deaths were due to heart and cardiovascular disorder). Auto accidents contributed 40% in the below 40 age group. But ⅔ of the group lost no time from work, and the ⅓ who did lose averaged 3.8 days.[8]
2. The Mayo Clinic Study (Dr. Harry Smith)[9] reported on 93 cases of coronary sclerosis in 1931 and reported the occupational frequencies of those afflicted as:

Physicians	10.7%
Bankers	5.3%
Lawyers	4.6%
Clergymen	4.6%
Laborers	2.6%
Farmers	2.6%

3. The 1950 McDonald Stewart[10] report on workers in England shows the incidence of coronary attacks as affecting the various occupations as follows, for all ages:

Physicians and Surgeons	368
Anglican Clergy	218
Banking and Insurance Officials	183
Coal Miners Below Ground	40
Agricultural Workers	32

This same report states that physicians are hit most frequently after 45 years of age. Dublin states that the ratio of affliction of doctors to general population is 1.18, but in 1944 the American Medical Association blamed 1 out of 5 deaths among doctors on heart disease. Dock predicted 1 out of 4 would die of it; and Dickinson and Walker summarized in 1948 that heart disease is definitely an occupational hazard of the medical profession.

Doctors are notoriously averse to taking time for exercise. It may be said that for many years they have also gained a reputation for generally discounting its value for the average man. During the war many doctors and flight surgeons came into contact with the benefits of physical training in various branches of the service, noticed the new trend, and many are now quite for it. Physical medicine doctors, flight surgeons, and sports doctors (including physical education doctors) praise its value. The latter deem it a necessity for health among children and adults alike. In rehabilitation various exercise therapies have taken a great leap into new prominence, and one has but to note the 893 page book edited by Sidney Licht on *Therapeutic Exercise*[11] to see how extensively it is used.

Fewer Coronary Attacks in Dynamic Workers Compared to Sedentary Groups. Several recent occupational surveys seem to connect physical exericse and work habits to fewer coronary attacks. Stocks[12, 13] points out that the rise in death rates for arteriosclerotic and atherosclerotic heart disease has paralleled the rise in the widespread use of motor cars and with automation in general. Those who walk the most have the least coronary disease. Stocks reported in 1951 that in occupations of hard physical exertion, as among coal hewers, navvies, dock laborers, and agricultural workers only 1/5 of the 4000 reported cases had coronary attacks.

In 1953 Morris, Heady, Raffle, et al,[14] reported that active workers had fewer coronary attacks than their sedentary co-workers, motor-bus conductors of the large double-decker London buses had fewer coronary attacks than the motormen who sat all day, time-keepers more than the dock workers, sorting clerks more than the carriers of mail, and that barbers, bartenders and physicians were the most afflicted groups.

The occupational group studies are supported by the most exact national necropsy study on 38000 non-coronary deaths, males 45 to 70 years of age, reported by J. N. Morris and Margaret Crawford in 1958.[15] This was based upon the reports of British, Welsh, and Scottish pathologists from 206 hospitals. These cases were classified according to their *activity during middle age,* involving 1700 occupations, and grouped as LIGHT, ACTIVE and HEAVY. The results are shown in TABLE VII:

TABLE VII—INCIDENCE OF HEART DAMAGE IN WORKING CLASSES IN GREAT BRITAIN
(3800 Non-Coronary Deaths)

Ages 40 to 70	*Main Working Classes*		
	Light	*Active*	*Heavy*
No.	1440	1429	862
With Large Fibrous Patch	3.5%	2.0%	1.2%
With Smaller Multiple Scars	9.9%	6.7%	5.7%
With Ischaemic Myocardial Fibrosis	13.4%	8.7%	6.8%

It is strongly indicated that physical activity is a protection against coronary (ischaemic) heart disease. Men in physically active jobs have less coronary disease in middle age; what disease they do have is less severe; and they develop it later than me in inactive jobs.

CLAIMS FOR SYSTEMATIC EXERCISE AS PREVENTION OF CARDIOVASCULAR "CLOGGING-UP"

Progressive deterioration, associated with "loafer's heart" is probably the greatest disease

of this first generation of automation. Several types of evidence is available to show the value of exercise to prevent deterioration of the cardiovascular system.

1. *Exercise Develops Collateral Circulation in the Heart and Improves Capillarization.* In 1957, among the highlights of health progress reported to the American Heart Association was this statement:

> "For narrowed coronary arteries, animal studies indicate that exercise helps build new channels of blood flow in the heart which is starved for blood. When an artery is blocked by disease, the heart tries to develop new or collateral vessels in the affected areas, to maintain nourishment to the heart muscle. Such growth of new arteries was stimulated in dogs whose coronary arteries had been artificially narrowed by surgery."

This report was based upon the work of Eckstein[16] of the Cleveland Clinic and reported in 1957.

Studies by Petren,[17, 18, 19] by Petren and Alsen,[20] by Petren and Sylvan,[21] and by Petren, sjostrand and Sylan,[22] on the value of endurance exercises to increase the number of capillaries in the motor brain and in skeletal muscle should be convincing because of some 40% more capillaries in the exercised animals compared to the sedentary dogs. August Krogh[23] anticipated this evidence in his book *The Anatomy and Physiology of Human Capillaries* (1922), in which he estimated that passive exercise was worth very little compared with hard exercise to open the capillaries in muscle.

2. *Exercise Delays Clotting of Blood After Fatty Meals,* and *Improves Metabolism.* It was summarized in 1957, in *Today's Health,*[24] publication of the American Medical Association, that:

> "Clotting somewhere in their veins or arteries kills more people over the age of 50 than any other physiological cause. Coronary thrombosis attacks 600,000 to 800,000 Americans every year (highest estimate now 1,300,000) and kills 200,000 (highest estimate 400,000)."

While anticogulant drugs (heparin and dicumerol) are used medically to prevent coagulation, persistent endurance exercise done every day, has great value, too, as reported by McDonald and Fullerton.[25] Wilens[26] explains the nature of the "blockade" in the arteries leading to clotting by giant molecules which do not pass freely through the capillary walls. Silver[27] found that vitamin D helps such permeability and cholesterol retards it.

All authorities agree that high cholesterol values (above 250 mg./100 cc.) are not desirable, and Gofman[28] presented graphs to show this high association with the incidence of coronary attacks. Keys[29] blames accumulation of cholesterol to values above normal as one of the main indicators of physiological aging. He advises professional men to look to their diet and protect their arteries from fat and cholesterol accumulation.[30] He suggests 1) Have a medical check-up regularly with cholesterol determination, 2) Be moderate with overexertion, 3) Avoid worry and tension, 4) Be moderate in the use of alcohol and tobacco, and avoid over eating.

It may be noted that Keys[31] blames eating fatty foods as the principal cause of atherosclerosis and that he places no value on exercise. It appears to us that he has experimented only with very mild exercise. Several other workers place exercise as most important. Among the first to come out in support of exercise were Dr. G. V. Mann[32] and also Drs. Jean Mayer and F. J. Stare[33] of the Harvard School of Public Health. Drs. Paul W. White[34] and T. G. Klump[35] have championed the place of exercise in preventing heart disease. Bello[36] has summed up the evidence to indicate that

Americans eat more fat but they also eat more meat and sugar than the nations which have relatively less heart disease than the United States, *and adds exercise* to Keys' list of preventive measures. *Time* also sums up the arguments.[37]

An important series of relationships appear between cholesterol and fat, and between both of these and several types of degenerative diseases. Keys[38] points out that serum cholesterol tends to be high in obesity, diabetes, nephrosis and in hypothyroidism. Peters and Man[39, 40] also show these interrelationships. It is an important thesis that if exercise is given progressively and long enough to affect the fat, to lower both fat and cholesterol, then it is probably valuable for counter-acting or preventing the degenerative diseases mentioned by Keys.

While biochemists argue over the relative importance of *Alpha* and *Beta* lipoproteins, and Gofman[41] depicts the *Beta* fractions as "killers," Keys[42] has shown that fat consumption is much less (around 20% by weight in Southern Italy and Southern Spain, compared to around 40% in the United States.) But Drs. Moon and Rinehart, of the University of California, reported that the first changes were increases in sugar and protein producing fibrous growths which diminish the functional resiliency of the elastic tissue fibers.[37]

A program in the U. S. Air Force, under Colonel Marshall E. Groover,[43] requires that any man with high cholesterol must go on a strict diet and exercise. It is claimed that 75 of 100 men were thus restored to normal cholesterol conditions.

Drs. Page and Corcoran,[44] of the Cleveland Clinic, point out that up to the age of 40 years the incidence of coronary disease is about *four times* as great among men as among women, due to the protective action of female hormones. These authors list six possible avenues of protection: 1) More iodine in diet, 2) Use of low-calorie and low-fat diets, 3) Use of female sex hormones, 4) Use of plant sterols which counter cholesterol (including corn oil, wheat germ oil, wheat germ, sito-sterol and other lineoleic acid containing materials), 5) Starvation, 6) Exercise. These authors point out that exercise is particularly valuable in moving the lympth, reducing the fat and cholesterol, and in preventing fat becoming stuck in the blood vessel wall filter (net). They say, "We sometimes suspect that the American penchant for sitting so firmly upon his derrier helps to cause arteriosclerosis." Animal experiments at Howard University by Wong and Johnson[45] revealed that chickens exercised on a treadmill showed lower levels of cholesterol in the blood and less clogging of coronary arteries than the sedentary chicks, and by huge margins. Repeating this type of experiment in 1959, but using male swimmers at Howard University, they showed that 12 members of the swimming team (consuming a typical American diet of 16% protein, 41% fat, and 43% carbohydrate for 20 weeks, and swimming 1 to 2 miles daily) had depressed cholesterol and phospholipid values while body weight remained constant.[45a] Interruption of the training and increased caloric intake during the Christmas holidays triggered the elevation of the serum factors and resumption of exercise lowered them again.

EXERCISE LEADS TO IMPROVED CIRCULATORY AND RESPIRATORY FUNCTION (FITNESS)

It is reasonable to postulate from all of the preliminary evidence available that *systematic progressive exercise,* along with moderation in eating, and the intake of natural poly-unsaturated fats (vegetable fats like corn oil, wheat germ oil, nuts) rather than fried animal fats, will have considerable protective value to prevent "clogging up". Actually, there is a good deal of evidence in this direction which should

not be brushed away. In experimental physical education the task is—knowing some of the scientific background—what can we do with an individual who goes on a training program. Dr. Hardin Jones[46] proved that the human circulation diminishes at a frightful rate after 18 years of age, so that by 35 an ordinary sedentary individual has lost about 60% of the circulation through muscles that he had at 18. We set out to design activity programs which will improve circulation.

Since 1941 we have repeatedly published reports which show that persistent exercise (longitudinally over 6 weeks to a year) makes very significant decreases in fat.[47, 48, 49] Eleven training experiments reported in 1958 show that profound cardiovascular changes are made by various physical training methods on young and middle aged men.[50] Over a period of several months, with the work gradually progressive, there is adaptation to the work and physiological adjustment which leads to higher cardiovascular levels; but there may be depressed levels, too, due to severe efforts which were suddenly imposed without warm-ups or training.

In 1947 our laboratory reported the effects in an individual of six months of almost complete inactivity (enforced by a bad fall) during which time 30 to 60 per cent reduction occurred in various physical fitness tests.[51] Then in the following six months of reconditioning these fitnesses were gradually restored to normal. We reported the research on a 59 year old professor and department head, who improved his fitness scores greatly in six months of progressive conditioning.[52] Rather remarkable improvements took place in this man as he changed from a sluggish condition to good tone.

Another man who had lost his morale progressed from a whimpering, bed-ridden individual to one who walked six miles per day with confidence and determination, and was restored to his job. In our opinion, an enormous change took place in his autonomic nervous system; he progressed from a wailing, fearsome, anxious, defeated para-sympatheticotonic person to a state of normal fitness.

Experiment on four matched groups of men demonstrated that those on wheat germ oil supplement and training exercises improved much more than a similarly matched group who did the exercises but did not take the wheat germ oil.[53] In another experiment three top executives[54] improved their autonomic nervous tone and reduced their swollen (oxygen deficient) hearts 30 to 35%, one of these losing no weight.

In general it has been reported that casual games like volley ball, golf, bowling, quoits, shuffleboard, etc., do not make the changes that have been obtained from rhythmical, continuous, and progressive locomotor type activities.[57] We have worked out progressions which have brought about much greater improvements relatively than programs in most games, or exercises on passive bicycles, or on massage or vibration tables. These progressions are arranged in a series of LOW GEAR, to MIDDLE GEAR, to HIGH GEAR rhythmical calisthenics which reach every muscle group and give the circulatory-respiratory mechanisms an adequate challenge.[58, 59, 60 61] Demonstration clinics are being operated in many Y.M.C.A.'s. A satisfactory set of adult physical fitness tables has been worked out. Our own center is continually at work with experimental groups to show the changes which individuals and groups can make in various sports and in prescribed exercises. Good results have been obtained in men and women on portable treadmills and rowing machines. Swimming, interval progressions on the track, and progressive calisthenics give the best results in improving the cardiovascular and autonomic nervous systems.

From the evidence we have now, it is possible to resist physical deterioration, to give more life for one's years, to "set the clock back." I do not doubt that the claims of Dr. Ernst Jokl[62] that regular training in adult life makes a fifteen to twenty year differential in maintaining fitness up to average or better. He is supported by our own, as well as papers by Drs. Edward Bortz,[63] Crampton,[64] Raab[65] and Klump.[66] Dr. Still[67] gives serious consideration to the possibility of living longer after 72, and

many geriatrics centers are at work on this possibility.

Improvement of basal cardiac function is highly associated with reduction of obesity, improvement of the sub-maximal and also maximal work capacity (and oxygen intake capacity) in the second half of life's span.[68] The potential of physical training is just beginning to be realized. If the training is persistent enough, regularly and repetitiously repeated, then the cholesterol levels may be lowered as shown by Golding,[69] Olson,[70] Chailley-Bert,[71] Pohndorf[72] and the studies of Wong, Johnson and various colleagues at Howard University, already cited. It is now common practice to use sports and exercises to improve cardiac function even in cases with impaired hearts.[73, 74] It is logical for medicine, physical education, public health, and dentistry to join hands in this work—in which physical training in adult life, along with good nutrition, are the principal effectors of fitness. Progressive exercises on training schedules which permit physiological adaptations to take place gradually and progressively represent the surest way to positive, buoyant, dynamic health.

BIBLIOGRAPHY

1. Biller, Florence E., "Occupational Hazards in Dental Practice", *Oral Hygiene*, 36: 194, (July, 1946).
2. Austin, L. T., and G. O. Krueger, "Common Ailments of Dentists: a Statistical Study", *Journal of the American Dental Association*, 35: 797, (July, 1947).
3. Bernstein, Arthur, and Jacob L. Balk, "The Common Diseases of Practicing Dentists", *The Journal of the American Dental Association*, 46: 525-529, (May, 1953).
4. Cureton, T. K. Jr., *Physical Fitness Appraisal and Guidance*, St. Louis: Mosby Co., 1947. Pp. 566.
5. ————, *Physical Fitness Workbook*, St. Louis: C. V. Mosby, 1947. Pp. 164 (3rd ed.)
6. ————, "Physical Fitness Work with Normal Aging Adults", *The Journal of the Association for Physical and Mental Rehabilitation*, 11: 145-149, (Sept.-Oct., 1957).
7. Sigler, L. H., "Tobacco as a Contributing Cause of Degenerative Coronary Disease", *New York State Journal of Medicine*, 55: 3107, 1955.
8. Parke and Davis Report, "Patterns of Disease", *Newsweek*, (Oct. 27, 1958).
9. Smith, Harry, "Athletic Heart an Unfortunate Term", *Proceedings of the Mayo Clinic*, 10: 122-123, (Feb. 20, 1935).
10. Stewart, McDonald G., "Coronary Disease and Modern Stress", *The Lancet* (London), 2: 867-870, (Dec. 23, 1950).
11. Licht, Sidney, (editor), Therapeutic Exercise, pp. 329-349, 762-769. New Haven, Conn.: Elizabeth Licht, 360 Fountain St., 1958.
12. Stocks, Percy, "Physical Activity and Arteriosclerotic Heart Disease", *Public Health Reports*, 70: 240-243, (Feb. 1955).
13. ————, "Coronary Disease and Modern Stress", *Lancet*, 260: p. 351, (Feb. 10, 1951).
14. Morris, J. N., Heady, J. A., Raffle, P. A., et al, "Coronary Heart Disease and Physical Activity of Work", *Lancet*, 265: 1053-1057, 1111-1120, (Nov. 4, 1953).
15. Morris, J. N. and Margaret Crawford, "An Epedemiological Approach to Coronary Artery Disease", *The Medical Officer*, 94: 251-256, (Oct. 28, 1955).
16. Eckstein, Richard W., (Cleveland Clinic), "Effect of Exercise and Coronary Artery Narrowing on Coronary Collateral Circulation", *Circulation Research*, 5: 230-235, (May, 1957).
17. Petren, T., "Die Kapilarisierung der motorischen Hirarinde bei Cavia Cobaya", *Morphol. Jahrb.*, 82: 537, 1938.
18. ————, "Quantitative Studien an den Kapillaren des centralen Nerven Systems bei Cavia Cobaya", *Morphol. Jahrb.*, 82: 554, 1938.
19. ————, "Die Totale Anzehlder Blutkapillaren in Herzen und in der Skelettmuskulatur bei Ruhe und nach langer Muskeloebung, etc.", *Anatomisher Anzeiger*, Jena: 81, 1935.
20. ————, and S. Alsen, "Die Kapillarisierung der Kleinhirnrinde de Cavia Cobaya", *Morphol. Jarhbk.* 82: 268, 1939.
21. ————, Torgny Sjostrand und Bengt Sylvan, "Der Einfluss des Trainings auf die Haufigkeit der Kapillaren in Hertz und Skelettmuskulatur", *Arbeitsphysiologie*, 9: 376-386, 1936.
22. ———— und Bengt Sylvan, "Der Einfluss in der Herzmuskulatur", *Morphol. Jahrbk.*, 78: 643-648, 1936.
23. Krogh, August, *The Anatomy and Physiologie of the Capillaries*, pp. 197, 199, 281, New Haven: Yale University Press, 1922.
24. Editorial, *Today's Health*, 35: 18, (Feb., 1957).
25. McDonald, E. A. and H. W. Fullerton, "Effect of Physical Activity on Increased Coagulability of Blood after Ingestion of High Fat Meal", *Lancet*, 2: 600-601, (Sept. 20, 1958).
26. Wilens, Sigmind L., "The Experimental Production of Lipid Deposition in Excised Arteries", *Science*, 114: 389-393, (Oct. 12, 1951).
27. Silver, Alene F., "The Effect of Vitamin D and Cholesterol on Capillary Permeability", Urbana: (Ph.D. thesis, physiology), 1948.
28. Gofman, J. W., H. B. Jones, F. T. Lindgren, T. P. Lyon, H. A. Elliott and B. Strisower, "Blood Lipids and Human Atherosclerosis", *Circulation*, 2: 696, 1950; also, Physiological Reviews, 34: 589-607, (July, 1954).
29. Keys, Ancel, "Cholesterol and the Aging Process", Minneapolis: (Report to the Minnesota Dairy Technology Society Meeting), June 21, 1949.
30. ————, "The Professional Man Grows Older—His Diet and His Arteries", St. Paul: (Paper at Minnesota State Dental Association, Feb. 1, 1950).
31. ————, "Coronary Arteries and Cholesterol" *Time*, (Dec. 1, 1952); also, *Time*, June 5, 1950; also, "Fat and Stress", Jan. 28, 1957.
32. Mann, G. V., "Exercise Helps Calorie Disposition in Cholesterol and Lipo-Protein Metabolism", *Federation Proceedings*, 14: 442, March, 1955).
33. Mayer, Jean and F. J. Stare, "Exercise Lack Related to Aches by Doctors", *Nutrition Abstracts and Reviews*, 7: 509, (1938).
34. White, Paul D., "The Ways of Life and Heart Disease", *North Carolina Medical Journal*, 17: 391-395, (Sept., 1956).
35. Klump, T. G., "A New Look at the Old Ticker", *West Virginia Medical Journal*, 50: (Dec., 1954).
36. Bello, Francis, "The Murderous Riddle of Coronary Disease", *Fortune*, pp. 142-146. 162-170, (Sept., 1958).
37. Cf. reference 31.
38. Keys, Ancelfl "Human Atherosclerosis and the Diet", *Circulation*, 5: 115-118, (Jan., 1952).
39. Man, Evelyn B. "The Significance of Serum Cholesterol in Thyroid Disease", *The Journal of Clinical Investigation*, 5: 654, (June 29, 1950).
40. Peters, J. P., E. B. Man, "The Significance of Serum Cholesterol in Thyroid Disease", *The Journal of Clinical Investigation*, 29: 1-11 (Jan. 1950).
41. Gofman, Cf. ref. 28.

42. Keys, Ancel, "The Trend of Serum-Cholesterol Levels with Age", *Lancet*, p. 209, (Aug. 2, 1952); "The Cholesterol Problem", Voeding, 13: 539-555, 1952.
43. Editorial, "Fat and Stress", *Time*, p. 79, (Jan. 29, 1957).
44. Page, Irving and A. C. Cocoran, "Hardening of the Arteries", *Today's Health*, 33: 18-21, (Mar., 1955).
45. Wong, H. and Frank Johnson, "A Fable from the Laboratory", *Sports Illustrated*, p. 27, (April 29, 1957); also (a) "Lipids Found Lowered by Exercise", *Fed. Proceedings*, 18: 77, (Mar., 1959).
46. Jones, Hardon, "Its the Blood Flow to Prevent Aging", *Time*, (Oct. 20, 1952).
47. Kireilis, R. W. and T. K. Cureton, "The Relationship of External Fat to Physical Education Activities and Fitness Tests", *The Research Quarterly*, 18: 123-134, (May, 1947).
48. Cureton, T. K., Jr., "The Effect of Physical Training, Sports and Exercises on Weight, Fat and Tissue Proportions", Washington, D.C. *Professional Contributions*, No 6, pp. 25-40, American Academy of Physical Education, 1958. (1201 16th. St., N. W.).
49. Cureton, T. K., Jr., "Physical Fitness, How to Earn It and Keep It", *The Journal of Physical Education*, 54: 3-14, (Sept.-Oct., 1956).
50. Cureton, T. K., Jr., "Effects of Longitudinal Physical Training on the Amplitude of the Highest Precordial T-Wave of the ECG", *Medicina Sportiva*, 12: 259-281, July, 1959.
51. Cureton, T. K., Jr., *Physical Fitness Appraisal and Guidance*, pp. 500-509, St. Louis: C. V. Mosby Co., 1947.
52. Cureton, T. K., Jr., "Physical Fitness Improvement of a Middle Aged Man", *The Research Quarterly*, 23: 149-160, (May, 1952).
53. Cureton, T. K., Jr., and R. H. Pohndorf, "Influence of Wheat Germ Oil as a Dietary Supplement in a Program of Conditioning Exercises for Middle Aged Men", *The Research Quarterly*, 26: 391-407, (Dec., 1955).
54. Cureton, T. K., Jr., "Shrinkage of Heart Size Associated with Improved Cardiovascular Condition Due to Progressive Physical Training of Three Middle Aged Men", *Journal of the Association for Physical and Mental Rehabilitation*, 10: 75, (May-June, 1956).
55. Cureton, T. K., Jr., "Improvement of Cardiovascular Condition of Humans Associated with Physical Training, Persistently Performed Sports and Exercise", *Proceedings of the College Physical Education Association*, 60: 82-104, (Columbus, Ohio), 1957. (a) "Physical Training Produces Important Changes, Physiological and Psychological", SPORT MEDICINE, pp. 46-63, Helsinki: Finnish Assn. of Sport Medicine, 1953. (b) "The Nature of Cardiovascular Condition in Normal Humans", I. (11:186-196, Nov.-Dec., 1957); II. Ibid., 12:8-12, (Jan.-Feb., 1958); III. Ibid., 12: 41-49, (Mar.-April, 1958); IV. Ibid., 12: 113-124, July-Aug., 1958).
56. Cureton, T. K., Jr., "Physical Fitness of Champion Athletes", Urbana: University of Illinois Press, 1951. Pp. 458.
57. Cureton, T. K., Jr., "The Value of Hard Endurance Exercises and Tests to Produce Changes in Weight, Fat, Metabolism and Cardiovascular Condition", Washington, D.C.: *Proceedings of the College Physical Education Association*, 162-171, 1958.
58. Cureton, T. K., Jr., "The Case for Physical Fitness", *Think*, Sept., 1958; also *Science Digest*, Dec., 1958.
59. White, William H., "Exercises to Keep Fit", (Cureton's Program for Men in Middle Age), *Sports Illustrated*, (Jan. 17, 1955).
60. Cureton, T. K., Jr., "Physical Fitness, How to Earn It and Keep It", *The Journal of Physical Education*, 54: 3-14, (Sept.-Oct., 1956).
61. Cureton, T. K., Jr., "Progressive Physical Training", *The Merit News*, Montreal: International Acceptance Corp., 2: No. 1, (Dec. 1958-Jan. 1959).
62. Jokl, Ernst, *Alter und Leistung*, Berlin: Springer, 1954. Pp. 75.
63. Bortz, E. L., "Making Life Longer and Better", *Geriatrics*, 8: 510-516, (Sept., 1953).
64. Crampton, C. W., "Medical Services in Aging and De-Aging", *New York State Journal of Medicine*, 54: No. 20, (Oct. 15, 1954).
65. Raab, W., "Loafer's Heart", *A.M.A. Archives of Internal Medicine*, 101: 194-198, (Feb., 1958); and "Preventive Cardiology", *Journal of the Maine Medical Association*, Jan. 1958.
66. Klump, T. G., "A New Look at the Old Ticker", *West Virginia Medical Journal*, 50: (Dec., 1954); Ibid., "New Horizons for Old Age", 44: 25-30, (Feb., 1948).
67. Still, J. W., "The Physiology of Aging—A Research Approach", *Journal of the Washington Academy of Sciences*, 48: 224-229, (July, 1958).
68. Taylor, H. L., Brozek, J. and Ancel Keys, "Basal Cardiac Function and Body Composition with Special Reference to Obesity", *The Journal of Clinical Investigation*, 31: 976-998, (Nov., 1952).
69. Golding, L. A., "The Effects of Physical Training Upon the Serum Cholesterol Levels in Adult Men", Urbana: (Ph.D. thesis, Physical Education, University of Illinois), 1958. (Sponsor: T. K. Cureton).
70. Ohlson, H. W., "The Effect of a Supervised Exercise Program on the Blood Cholesterol of Middle Aged Men", *Phi Epsilon Kappa*, Dec., 1958: Also *American Jour. Clinical Nutrition*, 7: 139-145, April, 1959.
71. Chailley-Bert, P. and Fabre-Chevalier, "Contribution a l'Etude des Variations du Cholesterol Sanguin au Cours des Activities Physiques", *La Presse Medicale*, 63: 21, (Mar. 19, 1955).
72. Pohndorf, R. H., "Improvement in Physical Fitness of Two Middle Aged Subjects", Urbana: (Ph.D. thesis, Physical Education, University of Illinois), 1957. (Sponsor: T. K. Cureton).
73. Licht, S., *Therapeutic Exercise*, pp. 329-349 "Sports in Medicine", pp. 767-769 "Exercise in Heart Disease", New Haven: (E. Licht Publisher, 360 Fountain St.), 1958.
74. Mellerowicz, H., Training, *Leistung, Gesundheit*, Berlin: 4 Sybelstrasse, 1958, pp. 231.

TESTS DE SANITATE E VALIDESSA PHYSIC IN DENTISTAS (CON CONCLUSIONES SUGGERITE PER ILLOS)

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SUMMARIO IN INTERLINGUA

Multe dentistas opina que le practica dental causa certe invaliditates occupational, incluse per exemplo exhaustion ocular, defectos postural, ptosis circulatori, e certe conditiones rheu-

matic. Un questionario de "participation in activitates physic", que esseva utilisate per le autor in su studios de Clinca de Validessa Physic, ha demonstrate que le dentistas non participa sufficientemente in exercitios physic pro prevenir le progressive deterioration de tissu conjunctive, de capillares, de musculos, del volumine respiratori, o del circulation general. Le gruppo studiate habeva un estate medie de 44,5 annos, un statura medie de 69,76 pollices, e un peso medie de 172,6 libras.

Plure recente investigationes occupational pare connecter le exercitio physic e le habitudes de travalio con un reducite incidentia de attaccos coronari. Il existe forte indicationes que activitates physic es un protection contra morbo cardiac coronari. Homines in physicamente exigente occupationes ha minus morbo coronari durante le annos del medie etate. In tanto que illes non escappa a iste morbo, illo es minus sever. E illes disveloppa lo plus tarde que le homines in occupationes sin activitate physic.

A base de omne le disponibile datos preliminari il es plausibile postular que exercitio systematic e progressive—insimul con moderation in le habitudes de alimentation e le ingestion de poly-non-saturate grassia (grassias vegetal, i.e. oleo de mais, oleo de germines de frumento, nuces, etc.) plus tosto que frigite grassia animal—es de considerabile valor protectori in le prevention de "obstructiones" in le systema circulatori.

Le melioration del function cardiac basal es marcatemente associate con le reduction de obesitate, le melioration del capacitate maximal e sub-maximal de travalio, e le mantenentia del capacitate de acceptar oxygeno durante le secunde medietale del extension del vita. Le valor de exercitios physic in iste area comencia a esser recognoscite. Si le exercitio es satis persistente, regular, e continue, un resultato possibile va esser frequentemente le reduction del nivellos de cholesterol. In nostre dies il es un practica commun de usar activitates sportive e exercitios pro meliorar le function cardiac mesmo in casos de afficite cordes. Il es logic pro le medicina, le pedagogia physic, le hygiene public, e le dentisteria de cooperar in iste area in que le trainamento physic del adulto, insimul con un alimentation rational, es le plus importante effector de validessa physic. Exercitio progressive, programmate de maniera que le requirite adaptationes physiologic pote occurrer gradualmente e continuemente, representa le plus secur via verso un sanitate positive, exuberante, e dynamic.

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Medical Views on Oral Problems

PREVENTION OF CARIES*

QUESTION:—*Should sodium fluoride (Luride) drops be used to prevent caries in infants?*

Shepard G. Aronson, M.D. New York, N. Y.

ANSWER:—While fluoridation of the community water supply is still the best method of providing dietary fluoride, in areas where water fluoridation is not feasible, fluoride supplements are considered to be of value. Since the consumption of fluoridated water by infants has been established as being safe, the present recommendation for infants below 2 years of age is to prepare water containing about 1 ppm of fluoride rather than to administer a definite or fixed amount of fluoride. Water prepared by adding 1 mg. of fluoride ion to one quart of water is used for drinking purposes and for the preparation of formulas and other food; 1 mg. of fluoride ion has been accepted as the optimum amount of fluoride to be taken daily by children 3 years of age and older and 0.5 mg. of fluoride ion per day or 1 mg. every other day has been given to infants between 2 and 3 years of age. Studies now in progress may provide a better basis for recommending daily allowances of fluoride for infants.

LELAND C. HENDERSHOT, D.D.S., PH.D.

* Questions and Answers, J.A.M.A., July 1, 1961, p. 1132.

POST-TRAUMATIC HERPES

QUESTION:—*A 45-year-old man hit his head against a board. He sustained a cerebral concussion manifested by momentary unconsciousness followed by headaches and dizziness. About a week later he developed herpes zoster involving the ophthalmic division of his right trigeminal nerve. Could there have been a direct causal relationship between the injury and the development of herpes? Have similar cases been described.*

Rudolph Joseph, M.D., Freeport, N. Y.

ANSWER.—The tendency to assign the blame to trauma in infectious, neoplastic, and degenerative diseases of the nervous system is becoming somewhat reflex in these litigious times. The usual response of the expert is to oppose the thesis. All zosters are due to the attack on sensory ganglia by the virus. These disorders have been classified as idiopathic and symptomatic, the latter to honor the fact that zoster occurs relatively frenquently in the presence of systemic infection or localized lesions of the spine or nerve roots such as meningitis, tuberculosis, Hodgkin's disease, metastic carcinoma, and even trauma. It is believed that these conditions somewhat "activate" the zoster infection.

Whether trauma had a direct causal relationship in the case in question would be a matter of opinion. The general possibility is alluded to in most textbooks and monographs dealing with the subject, where it is thought to be less rather than more likely. One can cite a case or two to support almost any thesis. In 1915, Stern (*Neuro Centrabl* 34:550, 1915) reported cases of gunshot wounds in tissues adjacent to the spinal column followed in weeks by herpes zoster distributed in an appropriate segment. Careful scrutiny of literature would add similar experiences. Dr. Alistair Dudgeon of London, currently working in Dr. Albert Sabin's laboratory in Cincinnati. has seen 2 cases of head injury followed by herpes zoster distributed in the ophthalmic division of the trigeminal nerve. In any case, causality is manifold, and one cannot indict a single factor of the several as a direct cause.

CHARLES D. ARING, M.D.

* Questions and Answers, J A.M.A., June 17, 1961, p. 974.

DENTAL THERAPY DURING ANTICOAGULANT THERAPY*

TO THE EDITOR:—*Reference is made to the article by Behrman and Wright, "Dental Surgery During Continuous Anticoagulant Therapy" (JAMA 175: 483 [Feb. 11] 1961), in which the authors state that my report of experience with 2 patients "appears to have been unduly alarming."*

Our 2 patients, both maintained at hypoprothrombinemic levels within the range recommended by Dr. Wright, underwent dental extraction performed by the chief of the dental service of a VA hospital. In both our patients, bleeding could only be controlled by returning the prothrombin level to normal by the use of vitamin K_1 oxide. In view of a fall in the hemoglobin level from 14.0 to 7.1 gm. per 100 cc. before appropriate therapy was instituted, we feel that 1 patient might have died of exsanguination. It should be emphasized that this same patient who hemorrhaged profusely following 2 separate extractions under hypoprothrombinemia had no difficulty after a third similarly performed extraction with normal prothrombin levels. We have since observed a third patient with similar results.

Our findings prompted us to suggest that long-term anticoagulant therapy be discontinued briefly

at the time of oral surgery. We recognize the danger of embolism, but this has not been reported in the short period during which we advocate stoppage.

A. M. Ziffer, M.D., 303 E. Par, Orlando, Fla.

The above comment was referred to the authors of the article cited, and they have submitted the following reply.

TO THE EDITOR:—*In the interim since the preparation of the paper referred to, we have continued to conduct dental extractions while patients have been under therapeutic levels of anticoagulant drugs. This markedly decreases the risk to many patients suffering from thromboembolic conditions. This procedure has been carried out in approximately 50 additional patients without complications. In our paper we described the control of the therapy and surgical techniques which has proved to be safe. We recommend that others adopt this approach. The fact that the conclusions of Ziffer et al. have been requoted and "condoned" by others has not contributed new knowledge. On the other hand, the original paper and the recent letter of Dr. J. M. Askey (*JAMA 176:746 [*May 27] 1961*) *are based on actual experience with this problem. This technique is now being widely adopted in leading medical centers.*

I. S. Wright, M.D., and S. J. Behrman, D.D.S. The New York Hospital, New York City 21.

* Letters to the Journal, J.A.M.A., Aug. 12, 1961, p. 461.

FLUORIDATED WATER*

QUESTION:—*For about 8 years fluoride has been added to the water supply of Corvallis, Ore., in a dilution of 1 ppm. Certain citizens have maintained that they have noted a dermatitis both from contact with and from ingestion of fluoridated water. I have been unable to find reports of this manifestation in the literature. Is it possible that fluoridated water can cause dermatitis? Is there any reliable evidence that it can cause any ill effects in human beings in this dilution other than slight straining or pitting of the teeth?*

Craig B. Leman, M.D., Corvallis, Ore.

ANSWER:—While it is true that most substances known to man are potential allergens, there is no documented evidence to indicate that fluoridated water, either by contact or through ingestion will produce an allergic response in other than extremely rare instances. Even in such cases it has not been possible to exclude the possibility that other substances in the water are the responsible agents. There is no reliable evidence that 1 ppm of fluorine in water will produce any ill effects in human beings.

JOSEPH L. BERNIER, D.D.S.

ANSWER:—There is no evidence that water containing 1 ppm of fluoride will cause dermatitis or any ill effects other than a very mild form of dental fluorosis (not detectable without special training) in a limited number of children. (Dean, H. T., in American Association for Advancement of Science: *Fluorine and Dental Health*, edited by F. R. Moulton, Washington, D.C.: The Association, 1942, pp. 23-31; National Research Council: *Report of Ad Hoc Committee on Floridation of Water Supplies*, Washington; National Academy of Science, 1952). In a study by McClure and co-workers, (*J Industr Hyg Toxicol* 27:159, 1945), 5 healthy young men were fed a diet supplemented by fluorine in various forms at different doses up to 6 mg. a day over periods of 21 to 26 weeks. Chemical analysis of all food and fluid intake and of all excreta (urine, sweat, and feces) were made, at intervals, for the content of fluorine. The study revealed that inflammation of the skin, which would indicate irritation, did not develop, although the amounts of fluorine being excreted in the sweat were unusually high.

On the basis of these findings and additional reports concerning medical findings in studies of fluoridation, it is reasonable to conclude that dermatitis is not produced as a result of the fluoridation of public water supplies.

DONALD J. GALAGAN, D.D.S.

* Questions and Answers, J.A.M.A., July 1, 1961, p. 1062.

PAROTID CALCULI*

QUESTION:—*What is the diagnosis and treatment of parotid calculi?*

Leonard J. Janis, M D, San Diego, Calif.

ANSWER:—Stones in the parotid ducts may cause a wide variety of clinical findings from the asymptomatic swelling of the parotid to the sudden severe pain and swelling during meals. The pain usually disappears soon, while the swelling may persist for a few hours to several days. Palpation reveals swelling that involves the entire gland, and binaural palpation may reveal the stone if it is close to the buccal papilla. Their most usual location is between the hilum of the gland and the point where the duct turns medially around the masseter muscle and can be detected only by probing the duct, by x-ray film, or by sialography. About 80% of these stones are radiopaque. A simple and inexpensive technique for their demonstration in the parotid duct by x-ray is to place an occlusal dental film between the inner surface of the check and the teeth.

Small stones may pass without treatment. Dilatation of the parotid duct by lacrimal probes and by "milking" it may deliver small stones, but operation may be necessary in the treatment of larger parotid-duct calculi.

STEVEN BORSANYI, M.D.

* Questions and Answers, J.A.M.A., July 1, 1961, p. 1130.

Announcements

POSTGRADUATE TRAINING IN PERIODONTIA AND ORAL MEDICINE NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The following postgraduate courses in Periodontia and Oral Medicine will be offered at the New York University College of Dentistry and will be given by Dr. Sidney Sorrin and associates:

No. 123.02. PERIODONTIA AND ORAL MEDICINE IN THE SPANISH LANGUAGE

Four weeks, Monday through Friday, 9:00 A.M. to 4:00 P.M.
March 12 to April 13, 1962 inclusive. Tuition including books and instruments approximately $385.00.

Theoretical and practical application of Periodontia and Oral Medicine is fully explained and demonstrated. Equilibration of occlusion is performed by the student on casts. Lectures and clinical demonstrations of diagnosis and treatment planning, conservative and radical techniques, equilibration of occlusion, home care, etc. The entire course is conducted in the Spanish language.

COMPREHENSIVE PREPARATION IN PERIODONTIA AND ORAL MEDICINE

No. 120.11 and 121.11. Two academic years, full time, September 18, 1961 to May 24, 1963.
Tuition $2,420.00 (two years). Instruments and books approximately $200.00.

No. 120.21 & 121.21 Four academic years, half time. September 18, 1961, to May 1965. (Two and one half days weekly.)
Tuition $2,420.00 (four years). Instruments and books approximately $200.00.

These courses are designed for comprehensive preparation in Periodontia and Oral Medicine and are of particular significance for certification towards specialization. All didactic and clinical phases are covered with the objective of developing expert proficiency.

No. 222. GRADUATE COURSE IN PERIODONTIA AND ORAL MEDICINE

Two academic years, full or half time, beginning Sept. 18, 1961. Tuition $2,420.00. (two years). Instruments and books approximately $275.00.

This program leads to the degree of Master of Science (in Dentistry). The objectives are to teach superior proficiency in Periodontia and Oral Medicine based on adequate background in the basic sciences.

For further information, write to the Secretary, Postgraduate Studies, New York University College of Dentistry, 421 First Ave., New York, N. Y.

THE MOUNT SINAI HOSPITAL NEW YORK 29, NEW YORK

The Department of Dental and Oral Surgery of The Mount Sinai Hospital of New York City, 100th Street and Fifth Avenue, will offer a post graduate course under the direction of Dr. Alvin S. Nathan in the autumn of 1961.

Minor Oral Surgery for the general practitioner

Instructors: Drs. Alvin Nathan, L. Stern, Jr., Marvin Freid, Peter Stern, N. Cranin and members of oral surgery staff.

A five half-day course to cover the problems of surgery encountered in daily practice. The course will consist of lectures, slides, closed circuit television demonstrations and student participation. It will cover such subjects as minor and major exodontia, history taking and patient evaluation, regional anesthesia, alveoloplasty and mouth preparation for dentures, apicoectomy and treatment in emergency situations.

Dates: Fridays, November 3, 10, 17, 24, Dec. 1, 1961. From 2:00 to 6:00 P.M.

Tuition $65. Enrollment limited

For Information, Brochures, Applications, address: Dr. A. Norman Cranin, Chairman, Education Committee Department of Dentistry, The Mount Sinai Hospital, 100th Street and Fifth Avenue, New York 20, New York.

DEPARTMENT OF PERIODONTIA AND ORAL MEDICINE NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The Department of Periodontia and Oral Medicine of the New York University College of Dentistry has announced a one-day basic course in "The Uses of Ultrasonics in Periodontal Therapy" to be given from 9:30 a.m. to 5:30 p.m. on Friday, November 17.

The purpose of the course is to acquaint the general practitioner with the principles and clinical uses of ultrasonic vibrations in periodontal therapy.

The curriculum will consist of lectures, a review of research in the field to date, closed-circuit television demonstrations, and participation by the students in the use of a prophylactic unit. The course will be directed by Dr. Sidney Sorrin, assisted by Drs. N. Alderman, A. Arvins, S. J. Ewen, M. J. Pomeranz, M. Simring, and S. S. Stahl.

Applications for the course and additional information can be obtained by writing to: Director, Postgraduate Division, New York University College of Dentistry, 421 First Avenue, New York 10, New York.

ROWE SMITH MEMORIAL FOUNDATION EIGHTH ANNUAL SEMINAR

The Eighth Annual Seminar of the Rowe Smith Memorial Foundation will be held November 30, 1961, to December 3, 1961, at the Fly-n-Fish Lodge at Karnack, Texas.

The subject will be "Disturbed Carbohydrate Metabolism." Topics to be covered include: epidemiology of disturbed carbohydrate metabolism; biochemistry of disturbed carbohydrate metabolism at the cellular level; dietary influences on blood sugar level; hormonal influences on blood sugar level; methods of detection of disturbances of carbohydrate metabolism; clinical types of diabetes mellitus; anthropometry and carbohydrate metabolism; hypoglycemia; influence of emotional factors on glucose metabolism; the treatment of diabetes mellitus.

The moderator will be D. Walter Cohen, D.D.S., Director of Periodontia, University of Pennsylvania School of Dentistry. Essayists include Donald W. Seldin, B.A., M.D., Professor and Chairman, Department of Internal Medicine, University of Texas Southwestern Medical School; and E. Cheraskin, M.D., D.M.D., Chairman of the Department of Oral Medicine, University of Alabama Dental School.

Those interested can obtain further information by writing the Rowe Smith Memorial Foundation, 501 State National Bank Building, Texarkana, Arkansas.

DEPARTMENT OF ENDODONTIA NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The faculty of the Department of Endodontia, New York University College of Dentistry, will honor Dr. Morris B. Auerbach, Professor and Chairman of the Department at a Dinner-Dance on Saturday evening November 4, 1961 at the Sherry Netherland Hotel, Park Avenue, New York.

For reservations and futher information write: Dr Alex Dinin, c/o New York University College of Dentistry, 421 First Avenue, New York 10, New York.

TUFTS UNIVERSITY SCHOOL OF DENTAL MEDICINE DEPARTMENT OF PERIODONTOLOGY ANNOUNCES THE ESTABLISHMENT OF A REGISTRY OF GINGIVAL DISEASE

The increasing awareness of the importance of gingival disease has created the need for a clearing house for the histopathologic evaluation of diagnostic and treatment problems. Practitioners are invited to submit gingival biopsies for diagnosis. Additional pertinent information will be provided by the Registry regarding the nature of individual cases. Permanent files will be maintained for follow-up case study.

Necessary forms and mailing containers will be sent on request. There is no charge for this service.

NORTHEASTERN SOCIETY OF PERIODONTISTS, INC.

The next meeting of the Northeastern Society of Periodontists will be held on November 3 at the Park Sheraton Hotel, Seventh Avenue & 55th Street, New York, N. Y.

The speakers at this meeting will be Sigurd Ramfjord, Ph.D., Ann Arbor, Michigan; Morton Amsterdam, D.D.S., Philadelphia, Pa.; Laszlo Schwartz, D.D.S., New York City; Isador Hirchfeld, D.D.S., Norman Orentreich, M.D., New York City.

NEW ENGLAND SECTION AMERICAN COLLEGE OF DENTISTS

The New England Section of the American College of Dentists will have their fall meeting on Wednesday, November 1, 1961 at the Statler-Hilton Hotel at 6:00 P.M. (Boston, Mass.).

Dr. Otto Brandhorst, the Secretary of the College, will be the guest speaker. The following members will be honored that evening:

Dr. Albert L. Midgley, Honorary Life Member; Dr. Austin T. Williams, Regent A. C. D.; Dr. Francis C. Ortolani; Dr. Richard J. Larkin, Dr. J. Walter Desmond.

ALBERT EINSTEIN COLLEGE OF MEDICINE YESHIVA UNIVERSITY POSTGRADUATE DENTAL PROGRAM

The Postgraduate Dental Program of the Albert Einstein College of Medicine of Yeshiva University announces the following postgraduate courses:

Anesthesiology DPD 15—Pain Control through Modern Analgesia in Dentistry. Dr. Stanley R. Spiro and Associates. April 12th and 13th, 1962. $60.00.

Endodontics DPD 22—Dr. Julius Fox and Associates. Thursdays, February 22nd, March 1st, and 8th, 1962. $100.00.

Endodontics DPD 25—Dr. Julius Fox, Wednesday, November 29th, 1961. $30.00.

Diagnostic Oral Pathology for Oral Surgeons DPD 28—Dr. Ernest Baden and Dr. Surindar Bhaskar. Thursday and Friday, October 26th and 27th, 1961. $60.00.

Dental Alveolar Surgery DPD 33—Dr. William Rakower, Dr. Herbert Calman, Dr. Stanley J. Behrman and Associates. Thursday and Friday, May 3rd and 4th, 1962. $60.00.

Preventative Orthodontics and Minor Tooth Movement DPD 55—Dr. Frank Kanter and Associates. Fridays, April 6th and 13th, 1962. $60.00.

Periodontics DPD 69 (A participation course) Dr. Irving Yudkoff, Dr. Marvin N. Okun and Associates. Monday through Friday, October 30th and 31st, November 1, 2, 3, 1961. $175.00.

Periodontics DPD 66—(A participation course) Dr. Marvin N. Okun, Dr. Irving Yudkoff and Associates. 10 Wednesdays, commencing February 28th through May 2nd, 1962. $225.00.

Pharmacology DPD 44—Practical Use of Drugs in All Phases of Dentistry—Dr. Stanley R. Spiro and Associates. Thursday and Friday, January 25th and 26th, 1962. $60.00.

Clinical Photography DPD 71—Dr. Eugene B. Blanck. Thursday and Friday, November 16th and 17th, 1961. $50.00.

Prosthetics DPD 77—(Full Denture Construction) Dr. Lester E. Rosenthal, Dr. Max A. Pleasure. Friday mornings, March 2, 9, 16, 23, 30, 1962. $100.00.

Prosthetics DPD 79—(Oro-Facial Prosthetics)—Dr. Lester E. Rosenthal, Dr. Max A. Pleasure, Dr. Stanley L. Lane, and Dr. Milton Ivker. Thursday and Friday, November 30th and December 1st, 1961. $100.00.

For further information and application blanks about specific postgraduate courses, write to Director, Postgraduate Dental Program, Albert Einstein College of Medicine, Yeshiva University, Eastchester Road and Morris Park Avenue, Bronx 61, New York.

NEW YORK SECTION AMERICAN ACADEMY OF DENTAL MEDICINE

The first meeting of the New York Section of the American Academy of Dental Medicine will be held on Thursday, October 19, 1961 at the Statler-Hilton Hotel at 8:30 P.M.

The speaker of the evening will be John J. Manhold, Jr., B.A., M.A., D.M.D., F.A.C.D. whose topic will be, "The Practical Application of Recent Experimental Evidence for the Dentist."

All members and their guests are invited to attend.

UNIVERSITY OF ALABAMA SCHOOL OF DENTISTRY

The following courses will be offered at the University of Alabama School of Dentistry during the months of November, December, and January.

Complete Dentures—John J. Sharry, B.S., D.M.D., November 4, 5, 6, 1961.

Clinical Oral Surgery—Robert B. Shira, Col., DC, USA, November 11, 12, 13, 1961.

Root Canal Therapy—Adeeb E. Thomas, D.M.D., November 25, 26, 27, 1961.

Oral Cancer—Leonard Robinson, D.M.D., M.S., M.D., December 9, 10, 11, 1961.

Hospital Protocol and Dental Therapeutics—Charles A. McCallum, D.M.D., M.D., January 13, 14, 1962.

Preventive Dentistry—Robert C. Caldwell, H.D.D., L.D.S., D.M.D., M.S. and faculty, University of Ala. School of Dentistry, January 15-19, 1962.

Children's Dentistry—Sidney B. Finn, D.M.D., M.S., January 20, 21, 22, 1962.

Statistics in Dentistry—Homer Jamison, D.D.S., Dr. P.H., January 27, 28, 29, 1962.

Further information may be obtained from The Director, Refresher Course Program, University of Alabama School of Dentistry, 1919 Seventh Avenue South, Birmingham, Alabama.

UNIVERSITY OF KENTUCKY COLLEGE OF DENTISTRY POSTGRADUATE REFRESHER COURSES

Complete Denture Prosthetics for the General Practitioner, Dr. William R. Laney, October 2-4, 1961.

Restorative Dentistry, Dr. John H. Mosteller, November 2 and 3, 1961.

Periodontics for the General Practitioner, Dr. Harry M. Bohannan, December 4-6, 1961.

Further information may be obtained by writing to Dr. Stephen F. Dachi, Director of Postgraduate Education, College of Dentistry, University of Kentucky, Lexington, Kentucky.

GOVERNOR ROCKEFELLER TO ADDRESS GREATER NEW YORK DENTAL MEETING. SCIENTIFIC SESSIONS TO EXPLORE NEW AREAS OF DENTAL PRACTICE

Nelson A. Rockefeller, Governor of New York, will address the December 4 evening general session of the 37th annual Greater New York Dental Meeting, it has been announced by Dr. David Tanchester, General Chairman.

The five-day meeting, to be held December 4 to 8 at Hotel Statler Hilton, New York City, will explore in depth a number of expanding new areas of dental practice that represent broadened professional obligations and opportunities, Dr. Tanchester reported.

Sponsored by the First and Second District Dental Societies of the State of New York, metropolitan components of the American Dental Association, the meeting is the world's largest seminar of postgraduate dental education. Last year's session was attended by 17,726 dentists and allied practitioners from all parts of the world.

Time and motion economy in practice administration, with efficient utilization of auxiliary personnel and equipment, will be studied at an all-day limited registration course. The growth of group dental insurance plans, and dentistry's newer responsibilities to an expanding, longer-living population, point up the need for planning and training in these areas, Dr. Tanchester noted.

Care of handicapped and problem patients, portable dental equipment for home-bound patients, and care of the chronically ill and aged, will be discussed and demonstrated at a general session.

A clinical pathological conference will cover diagnosis and treatment of common oral lesions. A companion session will consider the early detection of mouth cancer through cytology.

The use and misuse of sound in dental practice, rehardening of softened enamel, and the relative merits of partial and full coverage, will be among an extensive group of practice problems to be discussed by eminent essayists and clinicians.

The Participation Course, which proved so popular last year, will be repeated under the direction of Capt. John E. Flocken, Head of the Crown and Bridge Department, U.S. Naval Dental School, Bethesda, Md. In this clinical workshop, to be devoted to impression technique for fixed prostheses and temporary bridge construction, television cameras pick up the clinician's demonstration at his bench. This is projected on TV monitors so that each participant may simultaneously perform the technique at his bench, step by step.

The series of clinical demonstrations, so well received last year, will be expanded, with one group presented Tuesday afternoon and another on Thursday.

The meeting program will include joint analyses of recent dental researches by leading investigators from dental schools and hospitals. The "Luncheon and "Learning" session, at which dental leaders seated at heads of tables seating ten persons moderate informal discussions of their specialties, will be continued. In addition, the registered clinics, visual education films and other educational features that have always distinguished the meeting will be included.

The scientific research exhibits will present findings by research groups of hospitals, colleges and the armed services. A commercial exhibit section will display the latest in dental materials and equipment. The ladies' entertainment program will include a tour of the U.N.

To summarize, Dr. Tanchester said, the forthcoming session will present the latest current procedures in all major phases of dentistry, as well as studies of new techniques significant to future dental practice. The printed program will carry expanded synopses so that registrants may have in advance a clear grasp of subject matter.

For programs and reservations, please write Mrs. Mabel Purdy, Executive Secretary, Room 106A, Hotel Statler Hilton, New York 1, N. Y.

DENTAL GUIDANCE COUNCIL FOR CEREBRAL PALSY

The Annual Scientific Meeting of the Dental Guidance Council for Cerebral Palsy will be held at the Academy of Medicine Building, 103rd Street and Fifth Avenue, New York City on Thursday, November 16, 1961 at 8:30 P.M.

8:30 Symposium

"The Oro-Facial Complex in Patients with Neuro-Muscular Disorders"

Chairman:

Dr. Andrew M. Linz, D.D.S., M.Sc., (Dent.) President of the Dental Guidance Council for Cerebral Palsy; Chief of Oral Surgery, Out-Patient Department and Associate Surgeon Roosevelt Hospital, member of Oral Surgical Staffs Long Island College, Polyclinic and Manhattan Eye, Ear and Throat Hospitals.

Panelists:

1. "Some Plastic Surgical Problems in the Facial Area in Patients with Neuro-Muscular Disorders".

Ross M. Campbell, M.D. Diplomat, American Board of Plastic Surgery; Associate Professor of Clinical Surgery (Plastic Surgery) New York University College of Medicine; Associate Director, Institute of Reconstructive Plastic Surgery, NYU Medical Center.

2. "The Patient with Neuro-Muscular Disorders and his Social Environment".

Mary Stewart, M.A., Chief of the Psychological-Social Staffs and Research Project Coordinator at Manhattan Eye, Ear and Throat and Bellevue Hospitals for the project entitled "The contribution of the teamwork approach to the rehabilitation of the facially disfigured".

3. "Dental Problems in Patients with Neuro-Muscular Disorders".

Albert Green, D.D.S., Supervisor, Cerebral Palsy Dental Clinic, Department of Pedodontics, Columbia University School of Dental and Oral Surgery.

This symposium should be of particular interest to the dental profession and all members and their friends are cordially invited to attend. Further information may be secured at the offices of the Dental Guidance Council for Cerebral Palsy, 70 Fifth Avenue, New York 11, New York, ORegon 5-7100.

TUFTS UNIVERSITY SCHOOL OF DENTAL MEDICINE DEPARTMENT OF PERIODONTOLOGY

The curriculum in Periodontology has been developed with a view toward the expanding interrelationships of modern periodontal practice with other phases of dentistry, medicine and biologic science. Sufficient flexibility of subject matter is permitted in the presentation of courses to afford the continuity and correlation of training so essential for a comprehensive educational background.

Periodontology I is a two-year (two academic years of 18 consecutive months) specialist training program for individuals interested in qualifying for certification in Periodontia. It has been arranged in conformity with the requirements of the American Board of Periodontology. Approximately one-half of the course is devoted to didactic instruction, and the remainder to clinical work. In addition to training in the Periodontia clinic, the student is given the opportunity of participating in clinics of allied dental and medical specialties. This wide range of clinical contact provides a useful background for expert management of periodontal problems.

Periodontology II, a one-year specialist training program, is a modification of the two-year course and is offered for individuals with a year's previous graduate or postgraduate training in Periodontology.

Periodontology III is intended for individuals interested in the academic and research aspects of Periodontology, as well as preparation for specialty board certification. The course ordinarily takes two years and leads to the degree of Master of Science or Master of Dental Science. The course consists of the following subdivisions:

I. Didactic instruction in pre-clinical sciences;

II. Clinical training in Periodontology;

III. Research and thesis. The facilities of the Ziskin Memorial Research Laboratory in the Department of Periodontology, as well as those of other departments of the medical and dental schools are available for research activities.

For further information write: Director, Division of Graduate Studies, Tufts University School of Dental Medicine, 136 Harrison Avenue, Boston 11, Massachusetts.

FIRST DISTRICT DENTAL SOCIETY THE FIRST DISTRICT POSTGRADUATE EDUCATION PROGRAM

The Use of Precision Attachments in Partial Denture Construction, November 3, 1961—Dr. Philip Edelman.

Principles of Operative Procedures, November 3, 4, 1961—Dr. Wm. H. Silverstein.

Practical Orthodontics for the General Practitioner, November 8, 9, 1961—Dr. Saul R. Kaye.

Tested Technics for Establishing Practice Growth, November 8, 9, 1961—Dr. Abraham Berliner.

Cosmetic Approach to Fixed Anterior Restoration, November 10, 11, 1961—Dr. David Shelby.

Fixed Bridges and Procelain Restorations, November 15, 16, 1961—Dr. Harold Schwartz.

A Comprehensive Survey of the Acrylics in Dentistry, November 17, 18, 1961—Dr. A. Milton Bell.

Hospital Operating Room Technique for the General Practitioner, November 29, 1961—Dr. Bernard M. Cohen.*

An Entirely New Approach to Full and Partial Denture Construction, November 29, 30, 1961—Dr. Jack M. Buchman and Dr. Harold Gelb.

Analgesia for Modern Dentistry, November 30, December 1, 2, 1961—Dr. Harry Langa.

Bite Planes, Provisional Ligatures and Splints, November 30, December 1, 2, 1961—Dr. Abraham Berliner.

Oral Reconstruction, Emphasizing Esthetics, Using Porcelain Jackets and Porcelain Fused to Gold, December 1, 2, 1961—Dr. Herbert H. Kabnick.

Removable Precision Bridge Techniques in Reconstruction Diagnosis and the Approach Treatment, December 12, 13, 14, 15, 16, 1961—Dr. I. Franklin Miller.

All courses will be held from 10:00 A.M. to 4:30 P.M., unless otherwise noted, at the Statler Hilton, Seventh Avenue at West 33rd Street, New York 1, New York.

* 9:00 A.M. to 1:00 P.M.—Grand Central Hospital, 321 E. 42 St., New York, N. Y.

For further information and application blank, please write to the Postgraduate Education Program, First District Dental Society, Statler Hilton, New York 1, N. Y.

TEMPLE UNIVERSITY SCHOOL OF DENTISTRY GRADUATE AND POSTGRADUATE PROGRAM

Dental Roentgenology, Sydney Blackman, M.R.C.S., L.R.C.P., D.M.R.D. (Camb.), October 12, 13, 1961, Tuition: $50.00. Enrollment limit: 10.

Clinical Endodontics Seminar, Leonard Parris, D.D.S., October 20, 1961, Tuition: $35.00, (Including Luncheon).

Clinical Endondontics, Leonard Parris, D.D.S. and Associates, November 6 to November 11, 1961, Tuition: $200.00, Enrollment limit: 10.

High Speed in Operative Dentistry, Carlos Weil, D.D.S. and Charles A. Nagle, Jr., D.D.S., December 13, 1961, Tuition: $35.00, Enrollment limit: 10.

Implant Dentures, Aaron Gershkoff, B.S., D.D.S., & Norman I. Goldberg, D.D.S., January 8, 9, 10, 11, 12, 1962, Tuition: $200.00, Enrollment limited.

Periodontal Prosthesis, Morton Amsterdam, D.D.S., F.A.C.D. & D. Walter Cohen, D.D.S., February 5, 6, 7, 8, 9, 1962, Tuition: $275.00, Enrollment limited.

Pedodontics for the General Practitioner, Ernest F. Ritsert, D.D.S., February 12, 13, 14, 15, 16, 1962, Tuition: $175.00, Enrollment limited.

Practice Administration, Jay H. Eshleman, D.D.S., D.Sc., February 17, 1962, Tuition: $25.00, Enrollment limit: 20.

Advanced Fixed Prosthesis, George Straussberg, D.D.S., February 19 to 24, 1962, Tuition: $200.00, Enrollment limited.

Electronic Electrosurgery, Maurice J. Oringer, D.D.S., March 7, 8, 1962, Tuition: $60.00, Enrollment limited.

Transographics Seminar, William A. Miller, D.D.S., March 30, 31, 1962, Tuition: $75.00, Enrollment limited.

Immediate Surgical Endodontics, Leonard Parris, D.D.S., Harold Rappaport, D.D.S. and Robert Uchin, D.D.S., April 2 to 6, 1962, Tuition: $200.00, Enrollment limit: 10.

Advanced Surgical Techniques in Periodontal Therapy, Saul Schluger, D.D.S. & Jack Alloy, D.D.S., April 9 to 13, 1962, Tuition: $300.00, Enrollment limit: 10.

Full Denture Seminar (Special One-Day Refresher Course), Bernard Jankelson, D.M.D., Saturday, May 5, 1962, Tuition: $30.00, (including Luncheon).

Full Denture Prosthesis, Bernard Jankelson, D.M.D., May 7, 8, 9, 10, 11, 1962, Tuition: $200.00, Enrollment limited.

Graduate Orthodontics, Robert B. Hedges, D.D.S., M.S., F.A.C.D., and Associates, Tuition: $450.00 per semester.

For application and additional information, write to: Dr. Louis Herman, Director of Postgraduate Studies, Temple University School of Dentistry, 3223 North Broad Street, Philadelphia 40, Pennsylvania.

DENTAL SERVICE CORPORATION NAMES EXECUTIVE DIRECTOR

The appointment of Melvin L. Dollar as executive director of The New York Dental Service Corporation was announced by Dr. Matthew Besdine, Brooklyn, president of the corporation.

Mr. Dollar, formerly dental consultant for the Continental Casualty Insurance Company, Chicago, is planning the dental care insurance coverages that the organization will offer to the public within several months.

The corporation was created by action of the state legislature on April 28, 1960. It is chartered as a non-profit organization, authorized "to establish, maintain and operate a dental care plan or plans under supervision of the Insurance Department of New York State."

Mr. Dollar was the first full-time secretary of the old Committee on Economics of the American Dental Association. He also worked with the recent Commission on the Survey of Dentistry, serving as director of socio-economic studies.

UNIVERSITY OF PITTSBURGH SCHOOL OF DENTISTRY

Applications are now being accepted by the Graduate Division of the University of Pittsburgh School of Dentistry for graduate study in the fields of Anesthesiology, Oral Surgery, Orthodontics, Periodontics, and Prosthodontics, leading the Master of Science degrees. Selection of students for the Fall session of 1962 will be made in March, 1962.

A non-degree, full-time, twelve month course in General Anesthesia is also available for qualified dental graduates.

Graduate study in the pre-clinical basic sciences of Anatomy, Biochemistry, Microbiology, Pathology, Pharmacology, and Physiology, leading to the Master of Science or Doctor of Philosophy degrees is also offered through the Schools of the Health Professions. Successful applicants in this latter program are eligible for financial assistance in the form of traineeships.

For further information and application forms write to: Director of Graduate Education, University of Pittsburgh, School of Dentistry, Pittsburgh 13, Pa.

FIRST INTERNATIONAL CONFERENCE ON ORAL SURGERY JULY 1-4, 1962

The "First International Conference on Oral Surgery," sponsored by the American Society of Oral Surgeons in conjunction with the Royal College of Surgeons of England will be held at the Royal College in London, July 1-4, 1962. All interested dentists and physicians are invited to attend, and a bulletin describing the Conference is available on request to the American Society of Oral Surgeons, 840 North Lake Shore Drive, Chicago 11, Ill. The program will include symposia on the temporomandibular joint and on maxillofacial injuries in addition to a wide variety of scientific papers and discussion. Approximately one-half of these papers will be presented by essayists from North, South and Central America and the other half from the United Kingdom, Europe, Africa and Asia. Visitors attending the Conference will also have an opportunity to observe surgical procedures in the hospitals of London as a part of the Conference program.

Extensive social and ladies programs have been

arranged by the Joint British-United States Committee. Features of the social program will be a banquet at London's famed and historic Guildhall and a reception by H. M. Government.

For additional details and bulletin, dentists and physicians in the United Kingdom and Europe should write: Dr. Terence Ward c/o Royal College of Surgeons, Lincoln's Inn Fields, London, W. C. 2. Dentists and physicians in the U. S. and other countries should write: Mr. D. C. Trexler, American Society of Oral Surgeons, 840 N. Lake Shore Drive, Chicago, Illinois, U. S. A.

TUFTS UNIVERSITY SCHOOL OF DENTAL MEDICINE REFRESHER COURSES

October 1961 to December 1961

101 A—Dental Care for the Handicapped Child, Oct. 2, 3, 4 & 5, Dr. Michael Cohen & Staff, Tuition $125.00.

201 A—Cancer of the Oral Cavity and Salivary Glands, Dr. Gerald Shklar & Dr. Irving Meyer & Staff, October 12th for 6 Thursdays 1:00 p.m. to 4:00 p.m., Tuition $125.00.

709 A—New Concepts for Inlay Construction, Dr. R. Sheldon Stein, November 7 & 8, Tuition $75.00.

February 1962 to June 1962

301 A—Hospital Management of the Dental Patient, Feb. 7, 8, & 9, Dr. Richard Taylor and Dental Department, Boston City Hospital, Tuition $100.00.

705 A—Crown and Bridge Design and Construction, Dr. Frank A. Eich, February 15 & 16, Tuition $75.00.

300 A—A Participation Course in Applied Anatomy of the Head & Neck, Dr. Alton D. Brashear and Dental Department, Boston City Hospital, Feb. 28, March 1 & 2, Tuition $100.00.

401 A—Orthodontic Principles of Interest to the General Practitioner, Drs. Shapiro, Mendeloff and Field—February 28 to April 4th, 6 Wednesdays, all day, Tuition $200.00.

903 A—Complete Mouth Rehabilitation through Fixed Partial Denture Prosthodontics—Feb. 28th for 6 Wednesday afternoons and evenings—Dr. Harry Kazis & Dr. Albert J. Kazis, Tuition $250.00.

202 A—The Diagnosis, Management and Therapy of Lesions of the Oral Mucosa—Drs. Philip McCarthy, Francis P. McCarthy and Gerald Shklar—March 7th to April 25th, 8 Consecutive Wednesdays, Tuition $125.00.

200 A—Surgical Pathology of the Mouth and Jaws, Drs. Irving Meyer, Gerald Shklar and Staff—March 8 to May 10, 8 Thursdays 1:00 P.M. to 4:00 P.M., Tuition $125.00.

604 A—Prosthetic Procedures for the Periodontal Problem, Dr. Louis Alexander Cohn, New York City, April 5, 6, & 7, Tuition $150.00.

606 A—A Special Participation Course in Periodontology, Dr. Irving Glickman & Department Staff—April 9, 10, 11, 12, & 13, Tuition $175.00.

602 A—Clinical Adjustment of the Occlusion, May 2, 3 & 4, Dr. Bernard Jankelson, University of Washington, School of Dentistry, Tuition $125.00.

302 A—Minor Oral Surgery, May 8, 9 & 10, Dr. Richard Taylor & Staff—Boston City Hospital, Tuition $125.00.

100 A—Children's Dentistry for the General Practitioner, Dr. Sidney B. Finn, University of Alabama, May 21, 22 & 23, Tuition $125.00.

For further information concerning these courses please write to: Dr. L. Walter Brown, Jr., Director, Post-Graduate Refresher Courses, Tufts University School of Dental Medicine, 136 Harrison Avenue, Boston 11, Massachusetts.

AMERICAN ASSOCIATION OF AUDIO ANALGESIA

Time: Thursday, November 30th, at 8:00 P.M.

Place: The New York Academy of Sciences, 2 East 63rd Street, N. Y. C.

Program: Open Discussion with Audience Participation

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